FLIGHT
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Apl. 26 .... "The Design and Construction of Modern Rigid Airships." Mr. B. N. Wallis, before R.Ae.S. and Inst.Ae.E.
May 5 .... Aerial Pageant, Filton, Bristol
May 17 .... Aero Golfing Soc.—Spring Meeting, "Flight" Challenge Cup
May 28 .... Light 'Plane Meeting, Hamble
June 7 .... 7th Annual Middle East Dinner
June 9 .... Light 'Plane Meeting, Castle Bromwich
June 9-10 Aero Golfing Soc.—Team Match v. R.A.F.
June 20 .... Aero Golfing Soc.—Team Match v. Porters Park G.C.
June 26-29 F.A.I. Annual Conference, Brussels

EDITORIAL COMMENT

AFTER the last meeting of the Royal Aeronautical Society, with which is incorporated the Institution of Aeronautical Engineers, the nick-name given it by some of its critics, *i.e.*, "The Mutual Admiration Society," can no longer be taken to apply, the shorter, if less polite, title, obviously being a misnomer. Whether it is the new blood from the I.Ae.E., or not, we cannot say, but at the last lecture, that by Dr. Hele-Shaw and Mr. Beacham, the "mutual admiration" was certainly not conspicuous. In fact, it is a very long time since we have heard a paper quite as frankly criticised during the discussion following it.

Variable Pitch Airscrews

To our way of thinking, Dr. Hele-Shaw and Mr. Beacham stated the case for their variable pitch airscrew quite moderately and soberly, certainly making no exuberant claims for it. That they should subsequently be "rent asunder" therefore came to most as rather a surprise.

We have no personal interest in the variable pitch airscrew, and to us it matters not at all whether it be adopted or not, excepting in so far as it may affect the progress of flying, service as well as commercial. But we do think that, in this instance, a certain amount of unfairness—not intentional, we are convinced—was allowed to creep in.

The whole subject of whether or not the variable pitch airscrew is worth while depends entirely on its weight in proportion to the advantages which it can give. If it be accepted that the weight is and always will be, very great, then obviously there is little hope for the variable pitch airscrew. In their paper, the authors did not give specific figures of weight, but Mr. Lynam, of the R.A.E., quoted an 80 per cent. increase in weight of hydraulic gear as compared with the fixed pitch screw of the same size for the "Jupiter" engine. A similar ratio, he thought, applied to the propeller for the "Condor" engine. Mr. Beacham, in replying to the discussion, stated that already it had been possible to reduce that figure to 50 lbs. It is, of course, obvious that in submitting the first propeller

of this type to searching tests, the designers, in sheer self defence, had to " play for safety " by making quite certain that the mechanism was strong enough. One can visualise what would have happened had they been unwise enough to cut down weight and had anything then broken. The airscrew would have been condemned as unsafe. There is every reason to believe that, with further experience, a good deal of weight will be saved, and that the greatest objection to the variable pitch airscrew will thus be removed, or at any rate greatly reduced.

Several speakers in the discussion called attention to advantages of the variable pitch airscrew which the authors of the paper did not claim, and thus did not present as strong a case as they might have done. That, to us, is merely a confirmation of our view that the authors were very modest in their statements.

It is possible to think of other advantages, but the one we should like to put forward as applying particularly in favour of the automatic operation of the variable pitch airscrew is based on our concern for the pilot of a modern aircraft. Already he has more than enough to look after, even in a single-seater fighter. In fact, there are machines in existence, or planned, in which the rate of climb is so rapid that there is no time left for the pilot to read off the large number of dials and to make a note of these readings during the climb, since the climb is so rapid that several readings which should be taken at the same height cannot be so taken unless the climb is made in a series of " steps," with a flattening out between them. To expect the pilot to find time also for fiddling about with a pitch adjustment is rather asking a lot. This applies mainly to testing and peace-time flying. In actual combat, it is quite certain that in nine cases out of ten, the pilot would forget all about his pitch control.

With the view that the automatic mechanism is likely to be of use on single-seater fighters only, we do not agree. To us it seems that there are many other types to which it can usefully be applied. For example, the general tendency in large machines is towards multi-engines. There are several reasons for this. That usually advanced is the immunity from forced landings. There are others, however. Mr. North has pointed out (in THE AIRCRAFT ENGINEER of March 31, 1927) how the value of K increases with increase in power. The logical conclusion to be drawn from his arguments is that if we are to go on increasing the power of our engines and retain reasonable propeller efficiencies, we shall have to do so by increasing the number of engines.

Should the time come when we use five, six or more engines, it would become a practical impossibility for the pilot to adjust manually the pitch of all these airscrews with any prospects of getting the best results. Another case comes to mind where the variable pitch screw would seem to be worth while. We refer to the case of engines in tandem. We have not had many such machines in this country since the large four-engined Handley Page, but abroad the tandem arrangement is used fairly extensively. For instance, several Dornier flying-boats have not only one but two pairs of engines in tandem. A number of Caproni machines have adopted this arrangement, and recently there has been the Farman " Oiseau Bleu " with engines in tandem. One of the greatest objections to this arrangement is that if the front engine fails, the aft engine drops its speed because its propeller has to be designed with a coarser pitch on account of its working in the slipstream from the front propeller. Thus not only is the power of the front engine lost, but a large proportion of that of the rear engine. With variable pitch propellers, the rear pitch could be adjusted to the new conditions.

Doubtless it would be easily possible to visualise other cases in which the variable pitch propeller would be of great value, and we must admit that we do not, personally, share the pessimism that was so freely expressed at the lecture, We believe the variable pitch propeller to be well worth developing. Moreover, as it would appear that the hydraulic mechanism need not be either very heavy or very complicated, there would seem to be a good deal to be said for the automatically operated type.

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A Wonderful Flight

The French Nation in general, and French aviation in particular, has reason to be proud of the world tour which Costes and le Brix have just completed on their Breguet sesquiplane with Hispano engine. 36,000 miles in 338 flying hours, including the crossing of the South Atlantic, a non-stop flight from Paris to West Africa of 2,658 miles, and Tokio-Paris in 6 days, all in one tour, is no mean achievement, and British aviation circles will extend unstinted admiration of such a splendid feat. Luck has much to do with a long ocean crossing, but when the same reliability is extended to a prolonged tour of the world, one may safely assume that there was more than mere luck involved. MM. Coste and le Brix, FLIGHT salutes you !

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Three Men

We are unreservedly glad to be able to place on record in this issue that the flight of the Junkers monoplane " Bremen " from Ireland to Newfoundland was successful in so far as the three occupants managed to make their landfall. Their loss would have been one more addition to the already too long list of what we personally regard as senseless and needless sacrifices of life. And we are glad that it has not fallen to our lot to have to record another catastrophe. But having said that, we would state once again that we are not in sympathy with these attempts. So far as we can see, they serve no good purpose whatever, and until they can be undertaken in aircraft more suitable for the purpose they were better left alone. As it was, it is quite obvious that only by the merest chance did Kohl, von Hunefeld and Fitzmaurice escape the fate which has already befallen too many valuable pilots and others. It is no reflection on the crew to say that they were saved not by their personal skill but by providence, chance, luck, call it what one will. Just as easily as not they might have missed Greenly Island, and there would have been another Atlantic Flight Mystery to record. The North Atlantic has been crossed from East to West at last. Let us rest satisfied with that until such time as we can produce machines which really have a fair chance of success. As far as any further attempts, from this country at any rate, are concerned, the Air Ministry has a good remedy in the certificate of airworthiness. No machine can start on such a flight without being overloaded and without any further legislation this fact places in the hands of the authorities all the restrictive power required.

FLIGHT

THE GERMAN ATLANTIC FLIGHT

AN aerial crossing of the Atlantic from East to West has at last been accomplished, and the honour of this achievement falls on the two German airmen, Capt. Hermann Koehl and Baron von Huenefeld, and Commandant James Fitzmaurice of the Irish Free State Air Force—who, as reported in last week's issue of FLIGHT, had joined the German Atlantic attempt as second pilot in place of Herr Spindler.

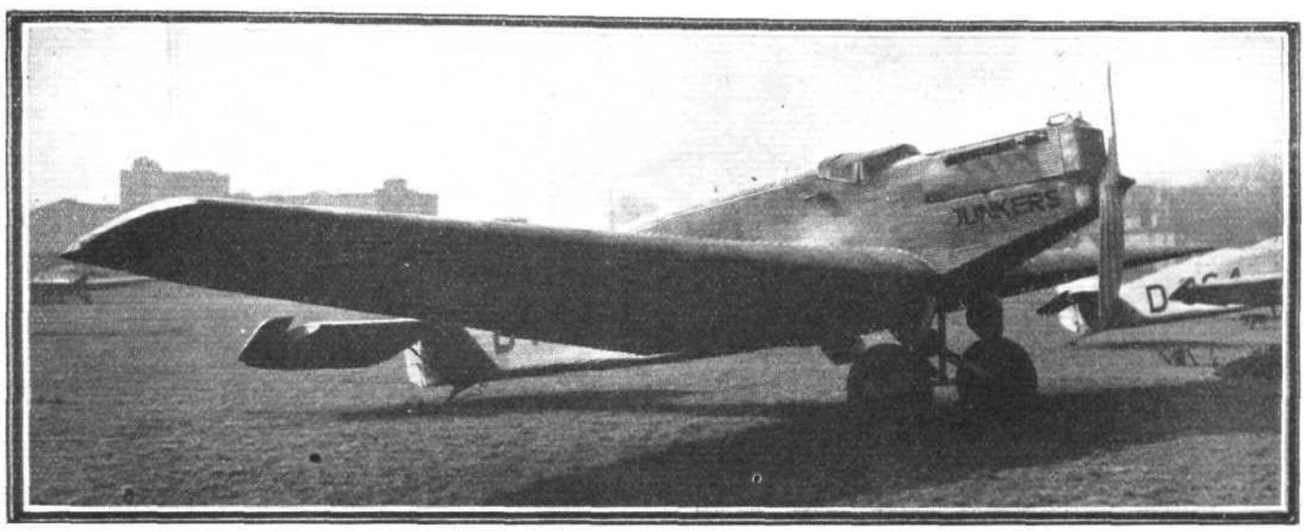
After having waited for some time for favourable weather at Baldonnel Aerodrome, Ireland, where they had arrived from Germany on March 26, in their Junkers monoplane "Bremen" the German airmen, with Comdnt. Fitzmaurice set out for America on April 12, and landed on Greenly Island, Labrador, on April 13, having covered some 2,200 miles in 37 hrs.

Reports that they were going to start on Thursday morning (April 12) brought large crowds to Baldonnel Aerodrome before dawn; amongst those present at the start were Mr. Cosgrave (President of the Free State Executive Council) Mrs. Cosgrave, Herr G. von Dehn (German Consul-General), Maj.-Gen. Hogan (Chief of Staff, Free State Army), Mr. Desmond Fitzgerald (Minister of Defence), and several officers of the Free State Army and Air Force.

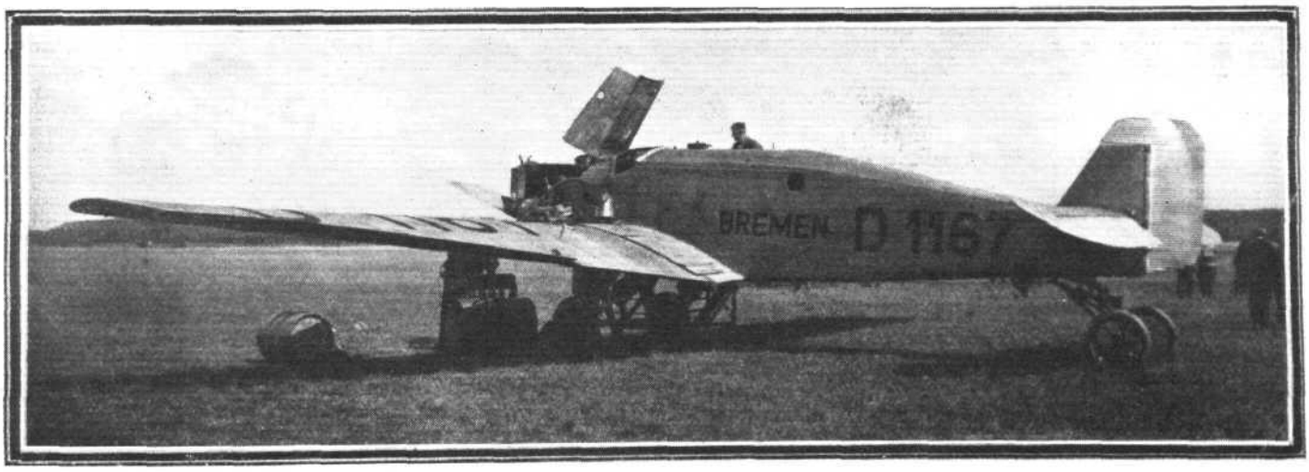
During the night the two German mechanics were busy giving the machine and engine a final overhaul and loading it up with fuel and provisions. Here, perhaps, we may give some brief particulars of the machine. It is a Junkers type W.33 low-wing monoplane (cantilever) with a Junkers L.5 engine of 280–310 h.p. A similar machine to this put up a world's duration record, on August 5, 1927, with a flight of 52 hrs. 23 mins. It has a span of 58 ft., an overall length of 34 ft., and wing area of 462·7 sq. ft. The weight of the machine empty is 2,690 lbs., but fully loaded for its Atlantic trip it weighed about 5 tons. It is of metal construction throughout even to the wing covering, mainly of duralumin. In addition to petrol tanks in the fuselage, tanks were also located within the wings in order to enable the machine to carry sufficient fuel for 45 hrs.' flight.

By 5 a.m. on the morning of the start all was ready, and the three airmen took their positions in the "Bremen," which carried the old German Imperial black, white and red flag, and also the Free State tricolour. After two unsuccessful attempts the engine was started and given a 15-minute "warm-up" Then at 5.38 a.m. the signal was given and the "Bremen" moved off slowly along the prepared runway, gradually gathering speed, until after a run of about 1,000 yards it rose into the air and commenced to climb.

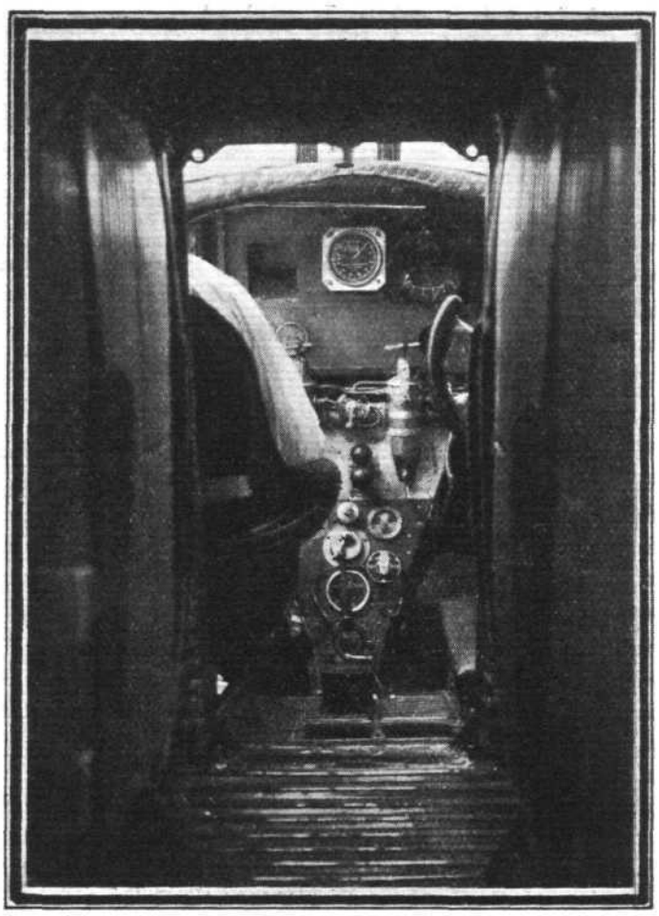
Once well off the ground Capt. Koehl steered towards the west, and in a few minutes the "Bremen" was lost to view in the haze of the Dublin mountains. One of the Free State Fairey biplanes escorted the "Bremen" as far as Athlone, and later the pilot reported that he left the German machine flying well.



THE GERMAN ATLANTIC FLIGHT: Three-quarter front view of the Junkers W.33 monoplane "Bremen," with 280-310 h.p. Junkers L.5 engine, in which Capt. Koehl, Baron von Huenefeld and Commandant Fitzmaurice flew from Baldonnel to Greenly Island, off Labrador.



THE GERMAN ATLANTIC FLIGHT: Filling up the "Bremen" with fuel; sufficient petrol was carried for a 45-hour flight.



THE GERMAN ATLANTIC FLIGHT: View inside the fuselage of the "Bremen," showing the main petrol tanks (at sides) and the pilots' controls. Additional petrol was carried in tanks situated within the wings of the machine, as shown in our illustration below.

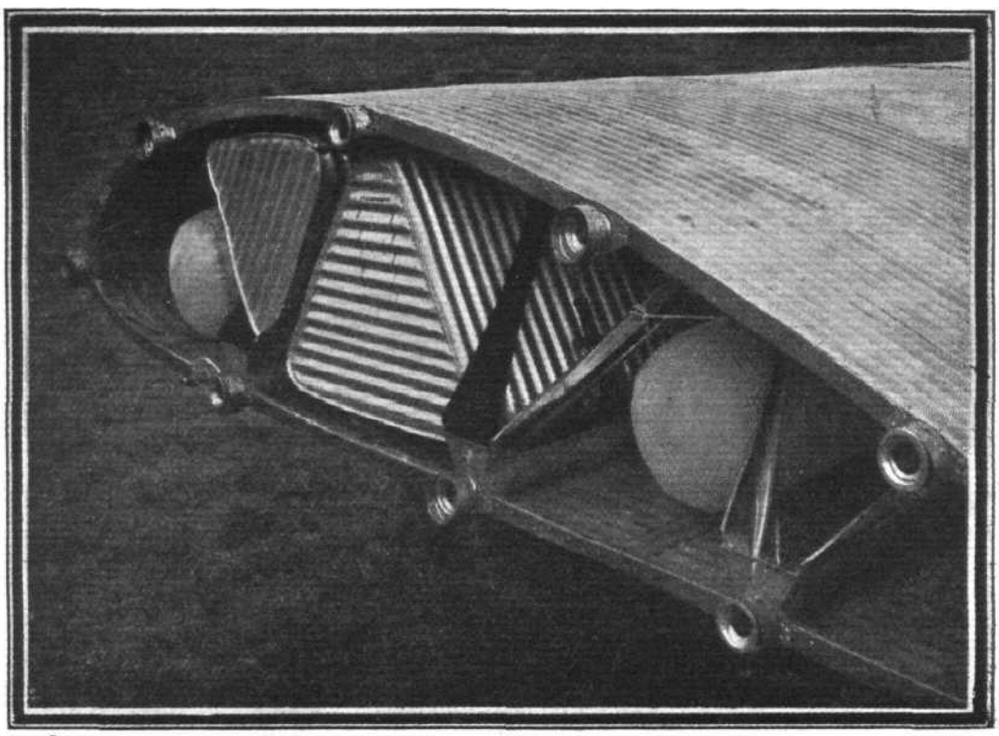
The last to be seen of the "Bremen" on this side of the Atlantic was when, at 7.30 a.m., it passed over Clifden, co. Galway, where Alcock and Brown landed after flying from Newfoundland in 1919. Capt. Koehl had decided to set a course along the Great Circle, away from shipping, and as the "Bremen" was not fitted with wireless it was not expected that more would be heard of their progress until their arrival on "the other side."

They expected to touch Newfoundland at about 4 a.m. on April 13, and arrive at New York at about 8 p.m. Nothing was seen or heard of the "Bremen" and its crew long after these times, although, as on the occasions of the previous tragic attempts to cross the Atlantic from east to west, various rumours came to hand of the German machine having been seen, or of its arrival in New York. Up to a late hour on Friday night (April 13), however, when they were long overdue, there was still no news, and it was feared that they had shared the same fate of those who had tried before them—Capts. Nungesser and Coli; Col. Minchin, Capt. Hamilton and Princess Lowenstein; Capt. Hinchcliffe and the Hon. Elsie Mackay.

Thousands of people had assembled on Mitchell Field, New York, at an early hour to greet the airmen—including Herr Erhardt Junker and Fraulein Junker—and waited in vain until the evening. Then, early on Saturday morning (April 14) Europe received the following brief news from Newfoundland. A wireless message was received at 8 o'clock local time, from the Point Amour station, stating:—"German plane at Greenly Island. Wind south-east. Thick.—W. F. Barrett."

Greenly Island is situated in the straits (Belleisle) separating North Newfoundland from the mainland, and lies off the boundary line of Labrador and Canada. Later, another message was sent out by the wireless operator at Amour Point, to the effect that the "Bremen" had landed on the rocky Greenly Island with slight damage to the plane, but that the crew was not injured and was well. The message added that owing to the inaccessibility of the site it was impossible to send further details just then. It was not until early this week that fuller details of the landing came to hand—but the first brief news was good enough, for the world knew that the airmen were safe. All that was known beyond this was that they had encountered four hours of fog and, running short of petrol, had descended at about 5.30 p.m. (Eastern Standard Time) on the first likely bit of land sighted.

As soon as the news of their whereabouts was known, several expeditions were organised to reach the stranded airmen. The Canadian Government ice-breaker "Montcalm" was ordered to proceed to Greenly Island, while two well-known Canadian pilots, Duke Schiller and Louis Cuisiner, set out from Murray Bay, Quebec, in an aeroplane fitted with ice skids on April 14 to try and reach Greenly Island, but a blizzard forced them to return. A second machine set out



The German Atlantic Flight: One of the wings of the "Bremen," showing the extra petrol tanks and the flotation bags.

again later. The Junkers Company at New York also sent a mechanic, with a new airscrew and equipment for carrying out repairs, to Montreal.

After considerable difficulty, the Canadian aeroplane piloted by Schiller landed on Greenly Island on Sunday afternoon, and the next day the machine left the island with Comm. Fitzmaurice on board en route for New York. The German airmen remained behind in order to try and repair the "Bremen," which had received greater damage than was at first indicated. Schiller and his passenger succeeded in reaching Natashquan, Quebec, where they landed for the night and to refuel.

Having thus got into direct touch with the outside world, the Atlantic airmen were able to disclose fuller details of their flight. It appears that for the first 30 hours after leaving Ireland the "Bremen" made steady and more or less uneventful progress. On approaching Newfoundland, however, very bad weather conditions were encountered and they entered a dense fog belt. For four hours they flew through the fog, and then it lifted—but only to be replaced by a blinding blizzard. To make matters worse the magnetic compass had become defective and they were blown off their course to the north-west—and the "Bremen" was running short of fuel.

Then the weather cleared a little and the bleak coast line of Labrador was sighted. A landing was essential now, and after cruising about for some time they spotted Greenly Island, with its frozen lake in the centre. This seemed to be the only available landing place, and so they decided to try for it. It was a difficult landing, and the "Bremen" was badly damaged as it alighted on the hard and rough ice, but, as previously stated, the airmen were unhurt. The "invaders" were hospitably received by the inhabitants of the island (some 14 strong), as the following message received by the Canadian Prime Minister from the airmen testifies:—

"Greenly Island, April 15.—Having landed in your great country in the German aeroplane 'Bremen' in the first successful aeroplane crossing of the Atlantic from east to west, we have received the greatest courtesy, hospitality and assistance. We beg to express our great appreciation. Please accept respectful greetings from the Irish and German crew of the "Bremen.'"

Latest reports to hand state that the "Bremen" is too badly damaged for repairs to be carried out on Greenly Island. It will be dismantled and taken on the "Montcalm" to Halifax, N.S., while Capt. Köhl and Baron Huenefeld will probably fly in Duke Schiller's relief 'plane to Murray Bay, then proceed with Maj. Fitzmaurice to New York in a Junkers F 13, now at Montreal.

Needless to say, the news of the "Bremen's" landing on the other side "aroused considerable enthusiasm throughout Germany, and in Ireland also. Numerous messages have been conveyed to the three airmen from various sources, some of which are as follows:—

Sir Samuel Hoare, Secretary of State for Air, sent a telegram to the German Ambassador in London, saying—"The Air Council desire to offer warm congratulations on the successful achievement by German aviators of first flight across Atlantic from East to West."

He also sent another to Mr. Cosgrave, viz.—"The Air Council send warm congratulations on participation of an officer of the Free State Air Force in the first successful flight across the Atlantic from East to West."

President von Hindenburg, Dr. Stresemann, Herr Koch (German Minister of Communications), Dr. Marx (Chancellor) and the ex-Kaiser also sent messages of congratulation. Mr. Mackenzie King, Canadian Premier, sent a message of congratulation to Baron von Huenefeld.

Mr. Cosgrave sent the following message to Commandant Fitzmaurice—"To the crew of the 'Bremen' and particularly to yourself as an officer of the Irish Air Force, I tender my heartiest congratulations on sharing first flight from Europe to America. Ireland is proud of your gallant part in this great advance towards the conquest of the air. Please convey to Baron von Huenefeld and Captain Koehl my admiration and congratulations."

President Coolidge sent the following message to the Governor-General, Irish Free State—"I wish to express to you as well as to the people of the Irish Free State the great admiration of myself and the people of U.S.A. for Commandant Fitzmaurice's share in the magnificent flight of the 'Bremen' and to rejoice for a safe arrival."

To which the Governor-General replied—"I appreciate your kind message of congratulation to the Irish people on splendid achievement of Commandant Fitzmaurice and his German comrades. May their heroism prove of lasting service to humanity and by completing the aerial conquest of the Atlantic lead to even closer relations between our countries."

The Free State Army authorities have promoted Commandant Fitzmaurice to the rank of Major.

Congratulations have also been sent by the Royal Aeronautical Society to the German Aero Club and to President Cosgrave.

Sir Sefton Brancker, Director of Civil Aviation (who is now in Spain) made the following statement in reference to the flight—

"This splendid sporting stunt is one which, incidentally, I hope will deter others from trying to repeat a hazardous adventure without practical value."

Flying at St. Moritz: One of the Fokker F.VII. (Bristol "Jupiter") monoplanes of the Balair Luftverkehr A.G. ("Balair"), which operates air services in Switzerland, on the Lake of St. Moritz. The Balair Company recently organised joy rides at St. Moritz with the machine shown here.

THE FRENCH WORLD TOUR

ONE of the most successful and longest air tours round the world in the history of aviation was concluded on April 14, in the evening, when Capt. Dieudonné Costes and his companion, Lieut.-Commander Joseph Le Brix, landed at Le Bourget from Athens via Marseilles. They have carried through a mission for France similar to Col. Lindbergh's recent mission for America, demonstrating the reliability of their French machine and French engine. The same machine, a Brêguet XIX biplane fitted with a single 600-h.p. Hispano-Suiza engine, was flown throughout, but at New York, when 23,000 miles had been flown, a new Hispano-Suiza engine of the same horse-power was installed to finish the rest of the tour. The performance of the machine was further enhanced by its record of 40,000 miles flown before the world flight began. It had created long-distance records in 1926. Costes himself used it with Capt. Rignot on the Paris-Jask flight of 3,345 miles in 1926.

Costes is one of the foremost pilots in France. During the war he distinguished himself by shooting down 13 enemy machines and since the war he has also won a notable career in aviation. His companion, Le Brix, is a noted French naval pilot and navigator with a fine list of achievements to his name.

The machine was in preparation last year for an Atlantic flight from Paris to New York, but unavoidable delay occurred. Then the unfavourable season arrived and it was thus decided to essay the first non-stop flight over the South Atlantic. It will be remembered that early in 1927 another French pilot, Capt. St. Roman, lost his life while attempting a similar flight.

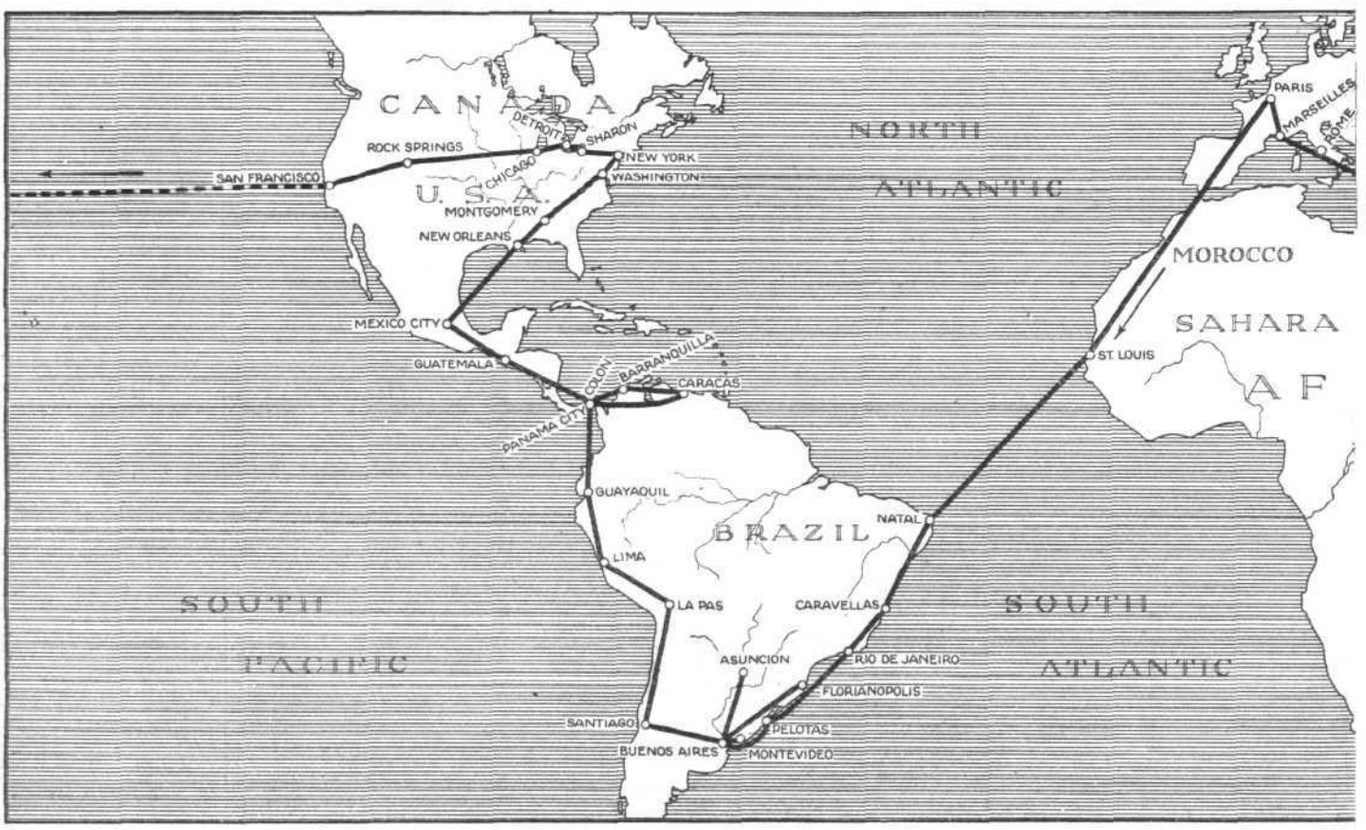
Costes at first proposed to link Paris with the Argentine Republic by air in five days. This was frustrated by the bad weather subsequently encountered along the South American coast and the hindrance of a slight mishap to the propeller which happened when they landed at night after flying the ocean. Actually the two countries mentioned were linked in nine days with six stops.

On October 10 the "Nungesser-et-Coli" left Paris in the morning with 650 gallons of petrol and 12 gallons of oil on board. It flew continuously for 26 hours 30 mins. and landed the two Frenchmen at St. Louis, Senegal, on the west coast of Africa, 2,658 miles from Paris. That was a fine start and augured well for the next dangerous stage over the sea. Costes said that there was sufficient petrol left for another six-eight hours' flight. Every precaution was now insured for the resumption. Transmission and receiving wireless apparatus were installed; two rubber boats attached, with bellows instead of a pump for inflation in quick time; while the Frenchmen's flying dress was so designed as to enable it to be rapidly shed should necessity arise.

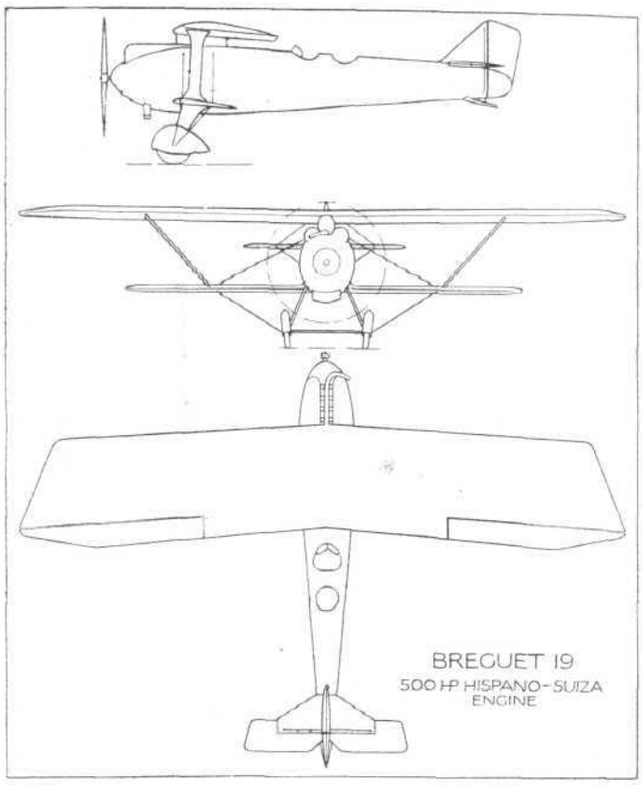
Rain fell at St. Louis for many days, making the ground so sodden that when an attempt to take off was made on April 13 with 475 gallons of petrol on board it was abortive. The next day, October 14, the difficulty was overcome and the Breguet started on its great ocean flight at 6.23 a.m., leaving the coast at Dakar an hour later and heading for the sea. Winds did not trouble their progress but neither were they helpful and off the South American coast thick fog lay for 4 hours. In spite of this their navigation was so accurate for the distance of 2,125 miles that the landfall occurred only 25 miles off the objective. Shortly before midnight and 19 hours 50 mins. after the departure from St. Louis, Africa, the landing was effected in the dark at Port Natal, Brazil, with slight damage to the propeller. Le Brix, the sailor, repaired it the next day.

Then began the long tour of South America in the interests of French aviation. They were received in triumph everywhere and honours were showered upon them. Picking up glory was not, however, the intention of the Frenchmen, and they worked hard and dangerously in the interests of their country, flying for hours over vast areas of jungle, mountain and plain, where, in some parts, no machine had ever crossed before. On October 16 the Brêguet started along the coast for Rio de Janeiro in very bad weather. Descents to the ocean surface were often a necessity in order to penetrate the fog belts over coast and sea, but in face of this 900 miles were covered that day and the landing made at Caravellas; whilst the next day brought the airmen to Rio de Janeiro after flying 466 miles in 4 hours 19 mins. There an enthusiastic reception included a welcome from President Washington Luis.

Another 900 miles' stage was flown on October 19 in about 12 hours to reach Pelotas, and the weather was the worst encountered since the departure from Paris. Costes remarked



THE FRENCH WORLD FLIGHT: This sketch map traces the outward course followed by Capt. Costes and Lieut. Le Brix after leaving Paris on October 10, 1927. The homeward flight from Tokio, part of which is included above, will be found in the sketch map on page 263



THE FRENCH WORLD TOUR: Sketch Plan and Elevations of the Breguet XIX (Hispano-Suiza) Sesquiplane.

that he would have preferred to cross the Atlantic again rather than do that trip down the coast. Violent storms and fog provoked them to wonder what would happen.

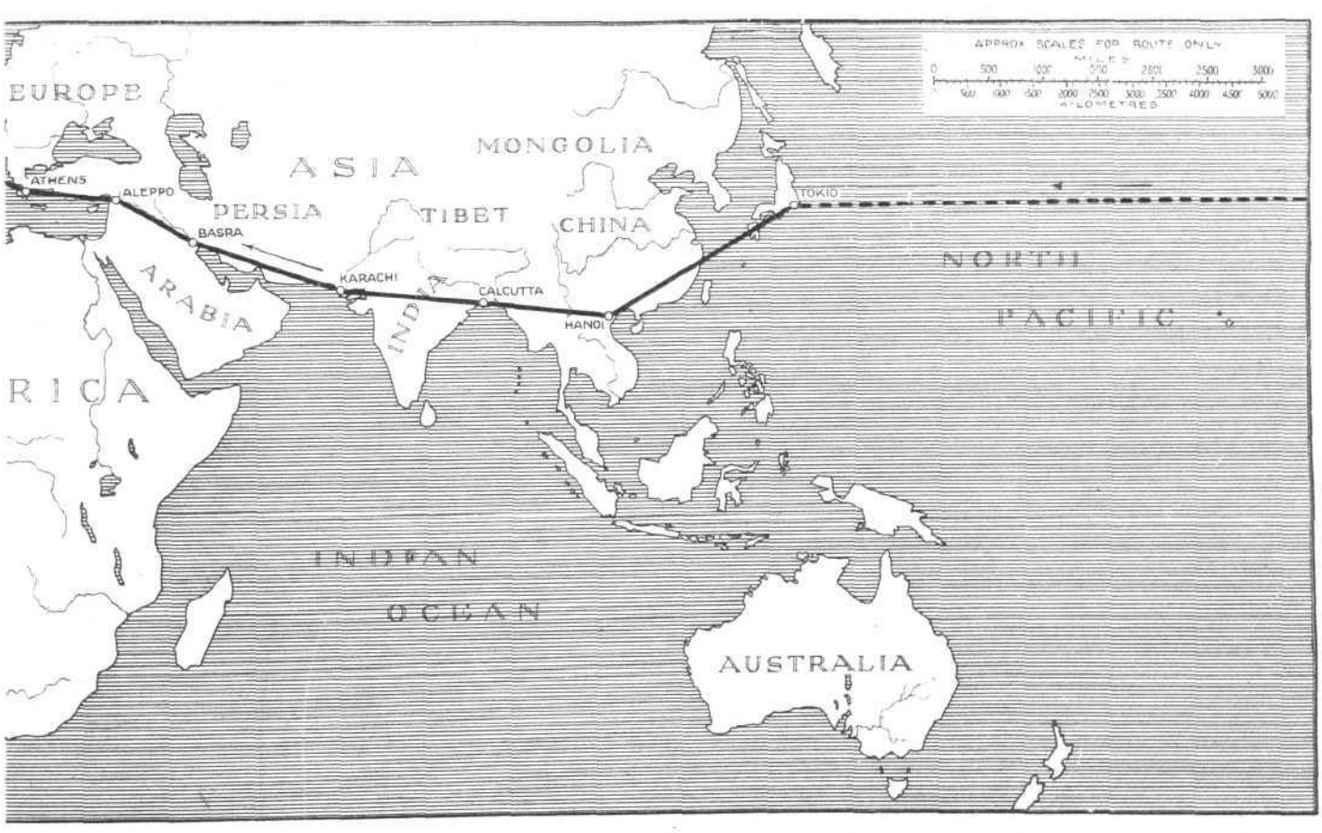
Using Buenos Aires as a base, Costes and Le Brix next commenced their numerous visits to S. American cities. They discussed proposed air services for mails and passengers, which the French Government are anxious to inaugurate in that continent. Their repeated long-distance non-stop flights over dangerous country clearly demonstrated to the people the practical reliability of aircraft for such services. Paraguay, Montevideo and Uruguay were all visited from Buenos Aires, the return trip often being flown in one day. A return journey between Buenos Aires and Asuncion takes about ten days by normal travel. The Breguet covered the 1,430 miles in 11 hrs. 47 mins.

After another stormy flight along the coast they reached Rio de Janeiro again on December 3. Costes wired about it :—"Weather terrible, had to go through or drown." A return to Buenos Aires followed nine days later, where, after a rest of six hours, the Frenchmen went on to Santiago, Chile, crossing the Andes on the way at dawn and covering altogether from Rio de Janeiro to Santiago, 2,174 miles, in 20 hrs. 34 mins. flying time.

At La Paz, Bolivia, is the highest landing ground in the world, 13,000 ft. above sea level. The Breguet landed on it on December 21 after flying from Santiago, a distance of 1,305 miles, in 12 hrs., a stage which had not previously been traversed by air.

Meanwhile Col. C. Lindbergh's "good-will" air tour of South America was in full swing, and Costes and Le Brix turned north in the hope of meeting the American pilot. Leaving for Lima, Peru, on December 29, they remained ten days at that city in the interest of their country, and then flew 816 miles in 8 hrs. on January 11 to Guayaquil, Ecuador. Lindbergh's trail was crossed at Panama City two days later; then from Colon followed a long flight of 1,050 miles in 9 hrs. to Caracas, Venezuela. Came a return to Colon on January 24, after a trip of 600 miles in 5 hrs. to Baranquilla, Colombia, and a course northward brought the tourists to Guatemala City after flying 900 miles over mountain and jungle for 8½ hrs. Six hours' flying on January 29 linked up Mexico City, 700 miles distant, and a great reception was accorded them during the five days' visit.

On February 4, the Breguet flew into the United States and landed at New Orleans after flying 1,100 miles in 10 hrs. 8 mins. It was picked up on the border by three U.S.A. machines from Kelly Field, but became separated later and



THE FRENCH WORLD FLIGHT: Here is traced the swift homeward flight of the French world expedition from Tokio which took six days. The last section to Paris is included in the map of the outward section on page 262.

id not see them again until close to New Orleans, where hree Navy Curtiss Hawks appeared to escort the Frenchmen o the landing field. The course followed on this last stage had led *via* Tampico, along the coast to Galveston, and then over Beaumont and inland for 50 miles. February 8 was a bad day for flying. Heavy clouds, rain and fog prevailed along the route to Washington and the experts were consequently against a resumption of the flight, but Costes decided to push on from Montgomery, to which place he had flown from New Orleans. An escort started with him but was soon lost sight of, and after a period of anxiety at the capital the Breguet landed after flying for 7 hrs. over 750 miles.

Amongst the officials there to greet them were Major H. C. Davidson; M. Claudel, the French Ambassador; and Mr. Davis, Secretary of War. The President received them in Washington and festivities were generously accorded during the five days' visit.

A flight of 2 hrs. over a distance of 225 miles preceded the arrival in New York on February 11. At this stage of the world tour 23,000 miles had been flown since the Paris start at an average speed of 107 m.p.h. in 215 hrs. flying time. Not once had the Hispano-Suiza engine given trouble, and the only mishap in any way was that already mentioned, the damaged propeller tip at Port Natal, Brazil, which Le Brix soon repaired. Fuel consumption had averaged 20 gallons to the hour for the first part of the flight and a little more for the complete tour to New York. A new 600 h.p. Hispano-Suiza engine was fitted for the remainder of the programme.

The United States, from New York to San Francisco, was next flown with four stops, Leaving March 2, a landing was made at Sharon, Pennsylvania, the same day. Detroit was reached on March 4, Chicago March 5, and a fine non-stop trip of 1,149 miles in 11 hrs. 30 mins. on March 6 brought them to Rock Springs, whilst another 776 miles in 7 hrs. 46 mins. the next day linked up San Francisco. The distance flown right across the continent was 2,672 miles.

A steamer was boarded next and the voyage made to Japan. Then began the record flight home to Paris in six days. Leaving Tokio April 8, the Frenchmen flew 2,620 miles to Hanoi, Indo-China, by the following afternoon, having made a landing en route at the Tonking frontier for re-fuelling. Another 1,400 miles in 13½ hrs. on April 10 brought them to Calcutta from Hanoi, then India was spanned to Karachi on April 11, a distance of 1,405 miles, with one intermediate landing at Jodhpur. On April 12 came Basra, another stage of over 1,000 miles, Aleppo, 1,480 miles, on April 12–13, Athens, April 13, 840 miles; and finally came Paris on April 14, 1,420 miles from Athens, *via* Marseilles.

During the brief stay at Marseilles a wing was damaged, but they resumed in spite of this, and put down at Le Bourget with the wing badly stripped of the fabric. It was estimated that the crowd which greeted them numbered 100,000.

They were officially received by M. Bokanowski, Minister of Commerce and Aeronautics, and taken through the streets of Paris through dense crowds to meet M. Poincare. The following morning they received the Legion of Honour from the President at Rambouillet. Costes said that they had flown 35,944 miles in 338 flying hours. The longest non-stop stage was at the start, from Paris to Senegal, Africa, 2,658 miles. When the landing was made for more fuel in China danger threatened the airmen from the Chinese, who fingered the machine all over and manifested their hostility to the Frenchmen. Had any display of resentment been shown an ugly incident might have happened.

The French World Flight: Lieut.-Com. Joseph Le Brix (left) and Capt. Dieudonne Costes, the two French pilots who have just completed their magnificent 36,000-mile flight round the world.

The following gives the approximate statistics of the French World Tour:—

Date	Stages	Mileages	Times Hrs.	Times Mins.
Oct. 10 ('27)	Paris–St. Louis	2,658	26	30
,, 14	St. Louis–Natal	2,125	19	50
,, 15	Natal–Caravellas	900	8	45
,, 17	Caravellas–Rio de Janeiro	466	4	19
,, 19	Rio de Janeiro–Pelotas	900	12	0
,, 20	Pelotas–Buenos Aires	453	4	6
Nov. 12	Buenos Aires–Montevideo	186	2	0
,, 22	Montevideo–Buenos Aires	143	1	10
,, 25	Buenos Aires–Asuncion	745	5	40
,, 25	Asuncion–Buenos Aires	745	6	7
Dec. 3	Buenos Aires–Florianopolis	870	9	30
,, 4	Florianopolis–Rio de Janeiro	497	5	0
,, 13	Rio de Janeiro–Buenos Aires	1,367	11	59
,, 14	Buenos Aires–Santiago	807	8	35
,, 21	Santiago–La Paz	1,305	12	0
,, 29	La Paz–Lima	745	7	30
Jan. 11 ('28)	Lima–Guayaquil (Ec.)	816	8	0
,, 13	Guayaquil–Panama City	807	7	0
,, 14	Panama City–Cofon	40	—	—
,, 17	Colon–Caracas (Ven.)	1,050	9	0
,, 21	Caracas–Baranquilla	600	5	0
,, 24	Baranquilla–Colon	403	4	28
,, 26	Colon–Guatemala City	900	8	30
,, 29	Guatemala City–Mexico City	700	6	0
Feb. 4	Mexico City–New Orleans	1,100	10	8
,, 6	New Orleans–Montgomery	300	—	—
,, 8	Montgomery–Washington	750	7	0
,, 11	Washington–New York	225	2	0
Mar. 2	New York–Sharon	350	3	18
,, 4	Sharon–Detroit	180	2	18
,, 5	Detroit–Chicago	250	—	—
,, 6	Chicago–Rock Springs	1,149	11	30
,, 7	Rock Springs–San Francisco	776	7	46
Apr. 8-9	Tokio–Hanoi	2,620	21	17
,, 10	Hanoi–Calcutta	1,400	13	30
,, 11	Calcutta–Karachi	1,405	—	—
,, 12	Karachi–Basra	1,330	—	—
,, 12-13	Basra–Aleppo	1,480	—	—
,, 13	Aleppo–Athens	840	9	0
,, 14	Athens–Paris	1,420	14	15

FLIGHT

PRIVATE  FLYING

A Section of FLIGHT in the Interests of the Private Owner, Owner-Pilot, and Club Member

ACROSS AFRICA BY LIGHT AEROPLANE

An Avro "Avian-Cirrus" Triumph

[*An Avro "Avian" light aeroplane fitted with the A.D.C. 30/80 h.p. "Cirrus" engine has accomplished the first light aeroplane flight from Cape Town to Cairo. This was Lady Heath's record and we give below her own personal account of part of her experiences.*—ED.]

HAVING keft Nairobi (aerodrome at Ngong, 6,200 ft.) when the machine took its longest run, nearly 250 yds. to take off, I had some difficulty with my heavy overload in rising high enough to get over the Kijabi escarpment, 10,000 ft., and had to work backwards and forwards for nearly half an hour and finally fly a 50 mile detour, follow the railway, and even then only scrape over the escarpment at 20 ft. In spite of this detour I reached Kisumir (270 miles) before Lt. R. Bentley who had found a favourable current and got over farther up. I only stopped to fill up there and proceeded at once to Jinja, 200 miles, which has the only aerodrome in Uganda. It is small, about 600 yards, and 4,100 ft. high, and mostly up hill into the prevailing wind. Bentley took his engine out there and I took the opportunity to rectify a cylinder blow by taking off all the cylinder heads with the help of a garage lad, and put new gaskets in. I also motored over to Entibbi to stay a couple of days with Sir William Gowers, Governor of Uganda, who knows a lot about aviation.

I was unable to go on without Bentley as the Sudan had forbidden women to fly alone there owing to recent outbreaks among the natives who killed a district Commissioner last December, and had to be bombed into submission in January. An entirely sensible regulation and one I wish could be followed by the Governments of that part of Tanganyika and N. Rhodesia where you get 700 miles of continuous forest and swamp, totally depopulated by the ravages of sleeping sickness. Before we could leave Jinja an extra runaway of 120 by 15 yards had to be cut. It has now been made permanent.

We left Jinja on March 28, at 6.10 a.m., but had to return after an hour's flight as Bentley had trouble.

We restarted early on March 29, and had a wonderful trip up the Nile, watching herds of elephants below us and various other beasts. I found I got on ahead of Lt. Bentley, and after doing numerous circuits (at 3,000 ft. above him) I pushed on alone, following the Nile the whole way, and shooting up the houses of District Commissioners at intervals. At Mongalla the temperature registered 108° and 112° in the afternoon. Lt. Bentley turned up later.

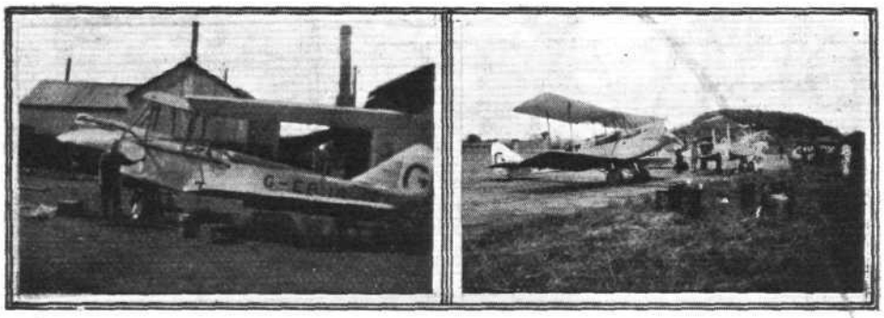
We left next morning, March 30, for Malakal, the worst part of the trip, over completely wild desert populated mainly by honey-badgers, ants, hornets and hostile natives. We flew in formation, reaching Malakal at 10 a.m. My engine never used more than 0·6 pints per hour of oil throughout and at times as low as 0·4 pints per hour. I then proceeded alone intending to get through to Khartoum if possible, leaving the sun-baked and cracked aerodrome at noon exactly. That is my last effort at flying at midday in the Sudan. Flying along the Nile the bumps were terrific and I was actually physically sick. My thermometer registered 105° F. in the cockpit, 120° in the slipstream and went right off the map when not shielded and held in the sun. Owing to the heat, and, fearing for my engine, I put down at the lovely large aerodrome at Kisti at 2.50 p.m., having covered 700 miles that day with a following wind. Dorys Bentley and I were provided with Arab ponies to go to the house of the District Commissioner, who, an ex-R.A.F. man, was a kindly host.

I pushed off alone at 6.30 next morning, March 31, and reached Khartoum in 2½ hours for 185 miles, where the R.A.F. gave me a wonderful welcome. The Bentleys arrived at 10.30, having landed in the desert. They gave us such a wonderful time in Khartoum, where the Air Force looked after us like a mother, that I hated leaving, but I felt the longer I stayed the harder it would be to go, so I just waited to see Lady Bailey come in.

I left Khartoum on April 2, and reached Atbara, 190 miles, in 2¼ hrs. An immense aerodrome is there and the kindly people insisted on keeping me for tennis that afternoon.

Leaving Atbara the next day, I followed the Nile as far as "Station 10," where, as I was unable to locate the aerodrome,

THROUGH AFRICA BY AVRO "AVIAN" (CIRRUS): These are two snapshots taken during Lady Heath's flight through the African continent. On the left is a view of the market place at Mwanza, photographed by Lieut. R. Bentley, who accompanied the Avro "Avian" in his D.H. "Moth" with his wife. In the group seen at Mwanza Aerodrome are (left to right): Col. Montgomery, Mrs. Montgomery, Lady Heath and Mrs. Dorys Bentley.



Lady Heath's Avro "Avian" (Cirrus) and Lt. R. Bentley's D.H. "Moth" (Cirrus) at Broken Hill during the combined flight through Africa.

I landed on the banks of the Nile, had a drink and took some photos. Left the Nile and followed the railway line through the desert. The Sudan is marvellous, they wire you out everywhere you go—the only country where they do so. Reached Wadihalfa (376 miles, 5½ hrs. flying), where the District Commissioner entertained me, as well as the usual routine of tappets, fillers, fresh oil and grease. I took off my prop. boss there, and found I could tighten up the prop. bolts two full turns each.

Left Wadihalfa before sunrise, on April 4, and intended to stop at Assuit, but I was flying on a map 100 miles to the inch (Bentley's maps were forgotten at one place, so the tracings I had been making of his of each lap could not be done !), and I was unable—and not very anxious, to locate the aerodrome there, so pushed right through to Cairo, 700 or 715 miles, taking exactly 9 hrs.

The Nile was my guide all the time, and I read a novel and ate chocolates most of the way. When I realised I was going right through, I thought I had better look respectable, arriving at such an important place as Cairo, so I poked out a pair of silk stockings from the back locker in mid-air and changed into them (not very difficult, my machine has toe straps in the rudder bar, you remember !).

I only had 40 gallons of petrol on board and was a little dubious about getting through, but I got through all right with a couple of gallons to spare. I was never so glad to see anything as the beauty of this old city unfolding itself before me. It was the nearest thing to heaven I have ever seen on earth.* Through Egypt there is almost 15 miles of cultivation on either side of the Nile all the way along through the desert—and there is sand, sand, sand. It is nice and cool, and I had a pleasant time with the Station Commander and his wife. The Air Force are wonderfully kind ; nothing is too much trouble for them. A Flight-Sergt. Lord cared for my " Avian." My engine ran like a sewing machine and was better than when I started.

Care and Maintenance

I attribute the success of the flight to the care the engine had. I did the tappet clearances every day, no matter how short the flight was, and cleaned the petrol and oil fillers. Only once did I fly in the heat of the day, and I never flew at less than 7,000 ft. to get the cool air. I ran my engine at 1,700 r.p.m. throughout and did the following as well :—

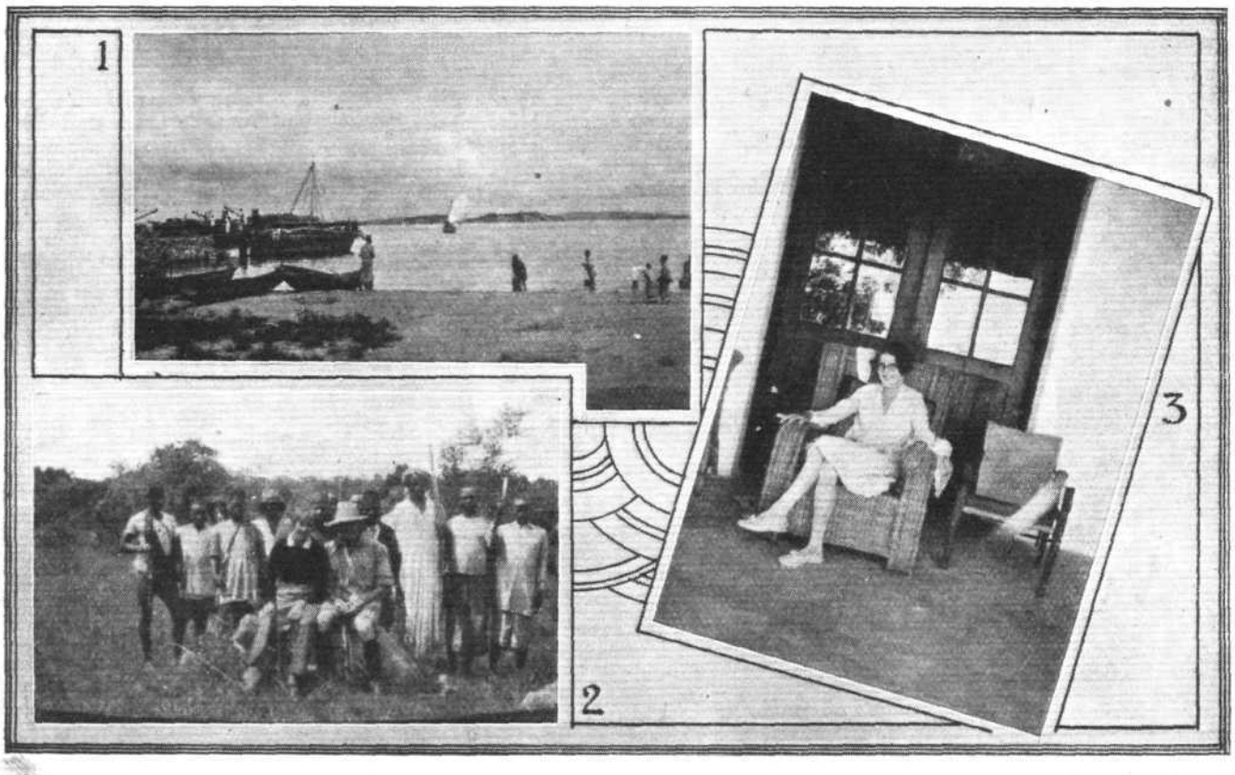
Every 25 hours, took out plugs, cleaned and tested them ; never finding one missing. Every 25 hours added one rubber to each compression leg to make up for perishing in heat ; took off cylinder heads, scraped pistons, and tightened down on new gaskets ; greased all hinges and movable parts ; tightened up prop.

I feel I owe a great debt of gratitude to Lieut. Bentley, without whom I would not have been allowed to cross the Malakal-Mongalla area, and without whom I would not have attempted to cross that awful forest and swamp belt between Tabora and Ndola ; and the Air Force, too, whose help and kindness have been unfailing.

Everyone admires and likes the Avro " Avian " and envies its speed.

List of Equipment

One spare wheel, complete with tyre ; 1 set tools ; 2 spare petrol gauge glasses ; 1 valve, complete with springs ; Rocker arm ; push-rod and nuts ; 2 sets induction gaskets, asbestos ;



FLYING THROUGH AFRICA : (No. 1) Lake Victoria Nyanza ; (No. 2) A shooting party in Kenya, with Lady Heath and a companion in the foreground ; (No. 3) Mrs. Dorys Bentley at the Muthaiga Club, Nairobi. These photographs were taken during the combined flight through Africa by Lady Heath in her Avro " Avian " (Cirrus), and Lt. R. Bentley in his D.H. " Moth ", with Mrs. Bentley as his passenger.

2 sets cylinder head gaskets, C. & A.; 1 set spare undercarriage-to-mainspar fittings; 1 pump; 1 funnel; 1 chamois; 1 cleaning cloth; 1 bottle dope; string; thread; linen; needles; 1 bottle shellac; assorted screws; split pins, bolts, nuts; 10 yards mosquito netting; 1 shot gun and 50 rounds ammunition; 1 change of underclothing, 1 pr. mosquito boots; 6 day dresses; 1 everyday dress, 1 fur coat, 1 hat, 1 flying topee, 3 pairs goggles (tinted and plain); 1 water bottle; packet chocolate, maps, passport, journey logbook, writing materials, camera, iodine, lint, bandages, vaseline, bottle of morphia and quinine. Total weight of above, 112 lbs. Oil; sump full and 1 gallon, petrol capacity, 60 gallons; usually carry 40.

Performance

The following are some of the statistics of the African flight :—

Dates.		Stages.	Mileages.	Times. hrs.	mins.
Feb.	25	.. Pretoria—Bulawayo	400	7	0
,,	28	.. Bulawayo—Livingstone	215	3	10
March	1	.. Livingstone—Broken Hill	350	5	20
,,	4	.. Broken Hill—Ndola	140	2	25
,,	5	.. Ndola — Abercorn	370	5	35
,,	7	.. Abercorn—Tabora	300	4	45
,,	8	.. Tabora—Mwanza	170	2	30
,,	14	.. Mwanza—Nairobi	320	4	30
,,	22	.. Nairobi—Kisumir—Jinja	360	5	30
March	27	.. Jinja—Nanasajali, and return ..	—	1	0
,,	28	.. Jinja—Mongalla	350	4	30
,,	30	.. Mongalla—Malakal—Kosti	700	6	35
,,	31	.. Kosti—Khartoum	185	2	30
April	2	.. Khartoum—Atbara	196	2	15
,,	3	.. Atbara—Wadihalfa	376	5	30
,,	4	.. Wadihalfa—Cairo	700	9	0

From Johannesburg—total mileage, 4,562 miles. Flying time, 71 hrs. 5 mins.

During the visits in South Africa, Lady Heath's Avro "Avian" did 60 hours' flying and earned between £1,100 and £1,200 for the Clubs.

The following cables were sent home :—To A.D.C. Aircraft, Ltd. :—"During seventy hours' touring South Africa and carrying first light aeroplane from Cape to Cairo time-honoured route the magnificent Cirrus in my Avian never missed a beat or dropped a revolution, although in Southern Rhodesia experienced tropical deluge and in Sudan thermometer showed hundred twenty Farenheit.—Heath."

To the Robinhood Engineering Works, Ltd. (K.L.G. Plugs) : —"During tour South Africa and flight first light aeroplane my Avian time-honoured route Cape Cairo have never found it necessary to change one of your plugs, even in gruelling heat Southern Sudan when carried thermometer registered 120 Farenheit tested here and all found perfect. Congratulations on your product.—Heath."

LIGHT 'PLANE CLUBS

London Aeroplane Club, Stag Lane, Edgware. Sec., H. E. Perrin, 3, Clifford Street, London, W.1.

Bristol and Wessex Aeroplane Club, Filton, Gloucester. Secretary, Capt. C. F. G. Crawford, Filton Aerodrome, Patchway.

Hampshire Aero Club, Hamble, Southampton. Secretary, H. J. Harrington, Hamble, Southampton.

Lancashire Aero Club, Woodford, Lancs. Secretary, C. J. Wood, Oakfield, Dukinfield, near Manchester.

Midland Aero Club, Castle Bromwich, Birmingham. Secretary, Maj. Gilbert Dennison, 22, Villa Road, Handsworth, Birmingham.

Newcastle-on-Tyne Aero Club, Cramlington, Northumberland. Secretary, A. H. Bell, c/o The Club.

Norfolk and Norwich Aero Club, Mousehold, Norwich. Manager, F. Gough, The Aerodrome, Mousehold, Norwich.

Nottingham Aero Club, Hucknall, Nottingham, Hon. Secretary, Cecil R. Sands, A.C.A., Imperial Buildings, Victoria Street, Nottingham.

The Scottish Flying Club, 101, St. Vincent Street, Glasgow, Secretary, Harry W. Smith.

Southern Aero Club, Shoreham, Sussex. Secretary, C. A. Boucher, Shoreham Aerodrome, Sussex.

Suffolk Aeroplane Club, Ipswich. Secretary, Courtney N. Prentice, "Hazeldell," Stowmarket, Suffolk.

Yorkshire Aeroplane Club, Sherburn-in-Elmet, Yorks. Secretary, Lieut.-Col. Walker, The Aerodrome, Sherburn-in-Elmet.

LONDON AEROPLANE CLUB

REPORT for week ending April 8.—Flying time, 46 hrs. 40 mins. Dual instruction, 29 hrs. 10 mins.; solo flying, 17 hrs. 30 mins.

Report for week ending April 15.—Flying time, 21 hrs. 45 mins. Dual instruction, 15 hrs. 50 mins.; solo flying, 5 hrs. 55 mins.

Dual Instruction.—With Capt. F. G. M. Sparks: Miss O'Brien, Miss W. Spooner. With Capt. S. L. F. St. Barbe: Mrs. Guest, W. R. Presland, L. W. Gibbens, S. Hansel, Dr. Cook, J. A. Crane, E. Davis, L. C. V. K. Watson, W. F. Cole, L. Rowson, J. A. Murphy, R. Ward, G. Black, Lord Carlow, J. G. Maitland-Edwards, Miss Johnson, A. O. Wigzell, A. E. Mines, G. A. Stedall, D. Green, F. C. Fisher, B. L. Middleton, Miss Wilson. With F. R. Matthews: Miss Wilson, Miss Cholmondeley, A. Mason, H. Sutton, E. R. Andrews, S. Hansel, P. A. Wills, W. F. Cole, Mrs. Cook, L. F. Brown, G. C. Gotheridge, G. A. Stedall, A. O. Wigzell, H. B. Michelmore, W. H. Lane, H. Beamish, R. M. Edwards, Dr. Cook, Miss Fletcher, A. Brunner, J. A. Murphy, R. Richmond-Brown, J. A. Crane, A. E. Mines, A. J. Richardson, Mrs. Guest, B. L. Middleton, D. Green, F. C. Fisher.

Solo Flying.—C. E. Murrell, R. Sanders Clark, G. W. Hall, E. C. T. Edwards, J. J. Hofer, Will Hay, E. R. Andrews, G. H. Craig, W. L. M. O'Connor, B. B. Tucker, H. B. Michelmore, L. C. Davey, J. H. Saffery, N. J. Hulbert, Maj. K. M. Beaumont, H. Solomon, E. E. Fresson, E. L. D. Moore, M. L. Bramson.

Pilot Instructors.—Capt. S. L. F. St. Barbe has been appointed Chief Pilot Instructor in place of Capt. F. G. M. Sparks, who left for Montreal on April 5 to take up his appointment of Chief Pilot Instructor to the Montreal Aero Club

Mr. F. R. Matthews has been appointed Pilot Instructor to the club. Mr. Matthews has for some years been on the instructing staff of the De Havilland Aircraft Co., and they kindly released him to the club.

Aerodrome and Social Facilities.—The club is now arranging with the De Havilland Aircraft Co. for further accommodation. This includes a larger shed for the club machines, lock-ups for the machines privately owned by the members, and club rooms.

Bristol Air Pageant.—The London Aeroplane Club will send a D.H. "Moth" to take part in the Bristol Air Pageant on May 5. Mr. Will Hay will represent the club in the Inter-Club Race, and Capt. S. L. F. St. Barbe in the Open Handicap.

Flying Return for the month of March.—Total flying time, 114 hrs. 40 mins. Dual instruction: 142 flights, 63 hrs. 30 mins.; solo flying, 158 flights, 45 hrs. 20 mins.; passenger flights, 18, 5 hrs. 50 mins. Total, 318 flights, 114 hrs. 40 mins.

BRISTOL & WESSEX AEROPLANE CLUB

REPORT for week ending April 14.—Total flying hours, 12 hrs. Instruction, 6 hrs. 15 mins.; solo, 3 hrs. 50 mins.; passengers, 1 hr. 55 mins.

Instruction with Mr. Bartlett: Miss Huggett, Dr. Lysaght, Messrs. Hall, Garnett, Kennan, Girdlestone, Stevenson, Newman.

Soloists: Messrs. Arnold and Stevenson. "A" Pilots: Messrs. Hall and Bathurst.

Passenger Flights.—With Mr. Bartlett, 5; with Mr. Hall, 2.

Mr. Downes-Shaw, accompanied by Mr. Jopp, left this aerodrome on Thursday, April 5, and flew by Croydon and Lympne to St. Inglevert in 2 hrs. 41 mins. Thence they flew by way of Paris-Avallon-Chalons-Lyons-Avignon to Marseilles. They are now returning to Filton, where they are expected on Sunday, the 15th.

The club having closed for Easter, there was not much flying done during the week before Easter Day. During the week-end we had a visit from Mr. Wallace, of the London Club, in his private "Moth." He was on his way to Cornwall, and stopped here for the night.

HAMPSHIRE AEROPLANE CLUB

REPORT for week ending April 8.—Total flying time, 30 hrs. 10 mins. Dual instruction, 13 hrs. 25 mins.; "A" Pilots, 6 hrs. 30 mins.; solo, 3 hrs. 35 mins.; passenger flights, 5 hrs. 15 mins.; tests, 1 hr. 25 mins.

Instruction with Flight-Lieut. F. A. Swoffer, 23 mins.; "A" Pilots, 8 mins.; soloists, 9 mins.; passengers with Flight-Lieut. Swoffer, 10 mins.; passengers with Mr. Forbes, 1 min.; passengers with Capt. Kirby, 2 mins.

Mr. Powell and Mr. Collier made a successful first solo during this week.

We were pleased to welcome several members of the British Private Aircraft Owners' Club on the 1st inst.

The total flying time for March, 105 hrs. 15 mins., is a record for any month in the history of the club.

LANCASHIRE AERO CLUB

REPORT for week ending April 7.—Flying time, 17 hrs. 50 mins. Instruction, 10 hrs. 10 mins. Solo flights, 5 hrs. 20 mins. Passenger flights, 1 hr. 50 mins. Tests, 30 mins.

Instruction (with Mr. Baker): Messrs. Benson, Tweedale, Weale, Johnson, Miss Hill, Eills, Stross, Faulkner, Goss, Mills, Gort, Hall, Greenhalgh, Allott, Birley, Mason, Hartley, Harrison; (with Mr. Cantrill): Johnson, Miss Baerlein, Davison, Mills; (with Mr. Scholes): Benson, Harrison, Fallon, Gort.

Soloists (under instruction): Cohen, Tweedale, Weale, Brooking, Gort, Hartley, Gerrard, Hall.

Pilots: Heath, Goodfellow, Meads, Twemlow, Cantrill, Davison.

Passengers (with Mr. Cantrill): Dr. Cheyne, Brownhill; (with Mr. Michelson): Miss Crompton; (with Mr. Williams): Mills, Miss Park; (with Mr. Lacayo): Whitehouse, Miss Lucius, Miss Mitchell; (with Mr. Meads): Goss. Messrs. Weale and Hartley made excellent first solos.

REPORT for week ending April 14.—Flying time, 21 hrs. Instruction 9 hrs. 25 mins. Solo flights, 6 hrs. 5 mins. Passenger flights, 4 hrs. 15 mins. Tests, 1 hr. 15 mins.

Instruction (with Mr. Baker): Goss, Tweedale, Johnson, Harrison, Mills, Hartley, Greenhalgh, Garner, Hall, Allott, Slack, Taylor, Watson, Miss Emery, Secker, Mason, Mehta; (with Mr. Cantrill): Miss Baerlein, Faulkner; (with Mr. Scholes): Goss, Hall.

Soloists (under instruction): Hall, Miss Baerlein, Ruddy, Gort, Mills, Allott, Watson.

Pilots: Michelson, Twemlow, Leeming, Crosthwaite, Gattrill, Williams, Goodfellow, Lavison, Lacayo, Cohen.

Passengers (with Mr. Williams): Brimlow, Garner, Gorton; (with Mr. Twemlow): Miss Clark, Miss J. R. Clark; Allott, Miss Dourthwaite; (with Mr. Lacayo): Whitehouse, Allott,; (with Mr. Cantrill): Mrs. Cooke, Miss

Farnsworth; (with Mr. Michelson): Goss; (with Mr. Leeming): Carey; (with Mr. Nelson): Stern; (with Mr. Baker): Fair, Mrs. Taylor.

High winds and snow restricted flying towards the end of the week. First solos were made by Messrs. Mills, Allott, and Watson. The last-named damaged an undercarriage, the other two putting up first-class shows. Mr. Ruddy completed the tests for his "A" licence.

We offer our sympathy to the Norfolk and Norwich Club on their recent accident, and hope that both the injured are making good progress.

MIDLAND AERO CLUB LIMITED

REPORT for week ending March 31.—The total flying time, 24 hrs.

Dual instruction (with Flt.-Lieut. Rose, D.F.C.):—E. P. Lane, G. Aldridge, H. Tipper, W. M. Morris, H. D. Coleman, J. R. H. Baker, S. G. Hall, H. Tower, S. Duckitt, H. Beamish.

Secondary dual:—A. B. Gibbons, J. Rowley, A. Ellison.

Solo:—A. B. Gibbons, E. D. Wynn, R. L. Jackson, W. Swann, J. Rowley, H. J. Willis, S. H. Smith, C. W. Fellows, G. Robson, E. R. King, A. Ellison, R. D. Bednell, E. J. Brighton.

Passengers: R. Aspinall, J. H. Moore, A. Coltman, H. Beamish, H. Turner.

On Monday, Mr. Norman Jones called at the aerodrome for petrol, and on Friday, Miss O'Brien arrived and left the following day.

REPORT for week ending April 7.—Total flying time, 19 hrs. 11 mins. The following members were given dual instruction (by Flt.-Lieut. T. Rose, D.F.C.): E. P. Lane, G. Aldridge, W. M. Morris, H. Tipper, R. L. Brinton, S. G. Hall, J. R. H. Baker, S. Duckitt, Capt. H. G. Tower, J. B. Briggs, G. E. C. Hill.

Solo:—G. Aldridge, E. J. Brighton, E. D. Wynn, S. H. Smith, R. L. Brinton, A. B. Gibbons, R. L. Jackson, J. R. H. Baker, A. Ellison, R. D. Bednell, A. M. Glover.

Passengers:—E. P. Lane, Miss E. Hitchmough, H. H. Kelly, J. Humphries.

On Sunday, Messrs. Aldridge and Baker were launched solo, and both put up a satisfactory performance.

REPORT for week ending April 14.—Total flying time, 7 hrs. 42 mins.

The following members had dual instruction (by Flt.-Lieut. Rose, D.F.C.): W. M. Morris, S. G. Hall, S. Duckitt.

Secondary dual:—J. H. R. Baker.

Solo:—E. J. Brighton, S. H. Smith, R. L. Jackson, J. R. H. Baker, C. W. Fellows, G. V. Perry, E. R. King.

Passengers:—A. G. Harwell, T. C. Pepper, A. Coltman, A. M. Glover.

Very high winds have restricted flying throughout the week.

NEWCASTLE-UPON-TYNE AERO CLUB

REPORT for week ending April 15.—Total flying time, 13 hrs. 50 mins. Dual instruction, 1 hr. 45 mins. Solo training, 45 mins. "A" pilots, 7 hrs. 35 mins. Tests, 50 mins. Passengers, 2 hrs. 55 mins.

The following flew under instruction with Mr. J. D. Parkinson: Miss Slade, Mr. L. M. Middleton, Mr. W. Todd, Mr. J. M. Campbell, Mr. F. W. Redshaw.

Soloists: Mr. J. Lloyd Browne, Mr. G. E. Brooks

"A" Pilots: Mrs. Heslop, Miss Leathart, Mr. Baxter Ellis, Mr. D. Wilson, Mr. A. Bell, Dr. H. B. L. Dixon, Mr. C. Thompson, Mr. F. L. Turnbull, Mr. J. D. Irving, Mr. P. F. Heppell.

Passenger flights: (with Dr. Dixon), Miss Dixon: (with Mrs. Heslop), Mr. C. Thompson; (with Mr. F. L. Turnbull), Mr. J. Bell; (with Mr. C. Thompson), Mr. Temple, Mr. Bulmer, Mr. Luckman; (with Mr. Baxter Ellis), Mr. R. G. Lawson; (with Mr. Parkinson), Mrs. Laing Gibbon, Mr. Redshaw; (with Mr. A. Bell), Mr. Walker, Mr. Cromerty.

The weather was exceedingly bad after Monday, until Sunday morning, thick fog and snow being almost continuous, with occasional strong winds.

NORFOLK & NORWICH AERO CLUB

TOTAL flying time for week ending April 15.—22 hrs. 45 mins.

Instruction with Mr. Fry: Messrs. A. Woods, A. Archibald, H. Birchall, G. Watson Parker, N. Lindley, H. Neave.

Soloists: Messrs. F. Gough, W. A. Ramsay, R. W. Moore, W. P. Cubitt, R. T. Harmer, N. Brett, H. Mack, H. Pank, R. Potter.

We regret to announce that about 5.55 p.m. on Sunday our *Moth* G-EBQX was turning to land when it struck some power wires close to the aerodrome, and crashed. The pilot, Mr. F. C. J. Fry, and pupil, Mr. H. Birchall, were slightly injured. The machine was rather badly damaged.

A prominent Norwich manufacturer, Mr. Henry N. Holmes, has presented the Club with £100 to show his confidence in aviation. Mr. Holmes, it will be recalled, was the co-donor with Mr. James Hardy of the *Moth* when the Club started operations.

NOTTINGHAM AERO CLUB

REPORT for week ending April 6.—Total flying time, 17 hrs. 25 mins. Dual, 7 hrs. 50 mins. Solo "A" 3 hrs. 20 mins. Solo under instruction 1 hr. 5 mins. Passenger flights, 4 hrs. 30 mins. Tests time, 40 mins.

Passengers (with Mr. Martin): Messrs. Sugg, Dickson, Armstrong, Booth and Murray; (with Mr. Whitby): Mr. Glenn; (with Mr. Hallam): Mrs. Hallam, Mrs. Kay, and Mrs. Sugg; (with Mr. Wilcox): Mr. Florance; (with Mr. Cyril Sands): Mrs. Blake and Mr. Blake.

Dual instruction with Mr. Martin:—Messrs. Glenn, Bradley, Ashworth, Calladine, Lazzerini, Lucas, Challand and Selvey.

Solo "A" Licence:—Messrs. Blake, Whitby, Hallam, Wilcox, and Cyril Sands.

Solo under instruction: Messrs. F. Granger and Pilgrim.

Our original machine "SK" has been collected from Messrs. De Havilland, Ltd., much to the delight of all members, for it is certainly an excellent "kite," from its appearance to its flying qualities.

All who may have occasion to visit Hucknall Aerodrome are advised that in future the club will be closed every Friday.

We are collecting our second machine in a week or so, and judging by our increase in membership, we will be requiring a third machine shortly.

FROM THE FLYING SCHOOLS

The De Havilland Flying School, Stag Lane Aerodrome

REPORT for week ending April 15.—Total flying time, 131 hrs. 55 mins. Instruction (dual), 36 hrs. 30 mins.; (solo) 68 hrs. 50 mins. Other flying, 26 hrs. 35 mins.

Despite some fairly rough weather, we have completed a reasonably good week's work, and several pupils are now flying solo quite efficiently.

One Royal Air Force Reserve pupil carried out a first solo, and another obtained his "A" licence.

Nine new *Moths* were tested during the week.

THE SECOND HAMPSHIRE AIR PAGEANT

THE second Hampshire Air Pageant, organised by the Hampshire Aeroplane Club, will take place on Whit Sunday and Monday, May 27 and 28, 1928, at the Hamble Aerodrome, near Southampton. It is the second of four provincial air meetings officially sanctioned by the Air Council to be held during the year, the others being at Blackpool, Birmingham and Bristol.

Last year, the Hampshire Air Pageant was one of the most successful provincial flying meetings held, and attracted approximately 50,000 people. This year an even larger and better aerial display is promised and there will be considerable improvement in the general organisation of the meeting, which, last year, left something to be desired, owing to the unexpectedly large invasion of the aerodrome by the public from all parts.

The Pageant last year was organised on the basis of a gathering of 25,000 people. Almost double this number converged on the aerodrome. Profiting therefore, by their experience, the organisers have this year taken steps to prevent any repetition of the congestion and delay experienced in getting to and from the aerodrome, and the Hampshire County Police are making special plans to organise the vast road traffic expected, and to facilitate its progress along specially chosen routes. Other improvements in ground organisation are also contemplated so as to prevent, as far as possible, all cause for complaint.

The Southern Railway have decided to provide special facilities and cheap tickets to all spectators using the railway, and they will run special trains to the aerodrome from London and large provincial centres. Motor coaches will run to Hamble from all adjacent parts of Southern England, at special fares. All the transport arrangements, in fact, have been drawn up with care and completeness

A particularly attractive programme of competitive and spectacular events has been arranged, and for variety and interest, the programme will be the best ever staged by a civilian flying organisation in this country. The club hopes, as a result of the display, not only to secure funds for the extension of its work and equipment, but also to familiarise the general public with flying, and to foster a practical trust in a comparatively new form of transport.

The Royal Air Force will again co-operate by sending to the Pageant various types of Service aircraft, and these will be seen to advantage in the first event on Whit Monday, the day of the Pageant proper, a parade and "fly past" of all the machines taking part. Various evolutions in the air, exhibitions of formation flying and aerobatics will be carried out by service and civilian aircraft, and thrills will be the order of the day. Imperial Airways, Ltd., are sending a large air liner, as used on the Cross-Channel air services, in which pleasure flights will be available to the public, both on Whit Sunday and Monday.

Whit Sunday will be "Members' Day," and on this day the various competing aircraft will assemble at the aerodrome. If there is a large number of entries for any of the races, heats will be flown on the Sunday, and the finals on the following day. Many well-known air pilots have already notified their intention of entering for certain of the competitive events, and there is likely to be very keen competition among them to win the several handsome challenge trophies offered.

Handicap races for all types of aircraft will be included in the programme. The chief event of the meeting is the Morris Open Handicap, for the Morris Challenge Cup, presented by Mr. W. R. Morris, of motor-car fame. This is open to all comers, and it is expected that some really fast military aircraft will be entered by aircraft constructors. The holder of the trophy is Mr. B. Youell, who won the race last year on his "S.E. 5A."

The President's Cup Race is open to any members of a British Aero Club, piloting any aircraft having an engine not exceeding 100 h.p. This cup was presented by Lord Louis Mountbatten, President of the Hampshire Aeroplane Club.

The Wakefield Challenge Cup was presented by Sir Charles Wakefield, Bart., for a race open to any light aeroplane. The winner last year was Mr. L. J. C. Mitchell, piloting a Bristol "Brownie," entered by the London Aeroplane Club.

A further event open to competition between representatives of the various subsidised aeroplane clubs in the country is the Light Aeroplane Utility Race, for the S.B.A.C. Challenge Cup. This race will be not only highly interesting, but will also indicate the extreme handiness of the modern light aeroplane. Each competitor, with the aid of his passenger, will start up his engine, fly round the course with his passenger fold wings and house the machine. In addition to the Challenge Cup, which may be won outright by three successive wins, there will be handsome cash prizes for the first and second places in all competitive events.

FLIGHT

THE VARIABLE PITCH AIRSCREW

With a Description of a New System of Hydraulic Control

THE paper under above title, by Dr. Hele-Shaw and Mr. Beacham, read before the R.Ae.S. & I.Ae.E. on April 12, proved not only a most interesting one, but also highly controversial.

The first part of the paper was devoted to outlining the advantages of variable pitch aircsrews, and curves were shown, taken from Dr. Watts' book and from THE AIRCRAFT ENGINEER (Technical Supplement to FLIGHT), the latter reproducing one of the set of curves from Mr. C. C. Walker's article on "Climbing Efficiency of Aircraft," which we published on January 27, 1927.

On the subject of the mechanical design of variable pitch airscrews, the authors divided into three classes the mechanisms which have been put forward of late years: Manually-operated gears; power-operated gears; and power-operated gears in which a governor adjusts the pitch. The authors of the paper, having selected as the best solution of the problem the third class, very naturally devoted their attention to this, and outlined the past history of the Hele-Shaw-Beacham variable pitch airscrew.

An order was given to the authors of the paper by the Air Ministry for a hydraulic variable pitch airscrew to be fitted to a Rolls-Royce "Condor" engine. The hydraulic gear was made by Harper, Sons and Bean, and the propeller successfully passed various spinning tests and was fitted on a "Condor" and flown at Farnborough. Following the first appreciation of their invention by the Technical Department of the Air Ministry, the authors of the paper secured the co-operation of the Gloster Aircraft Company in the further development of the hydraulically-operated variable pitch airscrew. A large number of designs for the chief types of engine were prepared by Mr. H. L. Milner under the direction of Mr. H. P. Folland, and the first design to be actually produced was one for a "Jupiter" engine. The airscrew for this had Duralumin blades manufactured by the special "Gloster" process which that firm has been developing of late. The Gloster Company has completed spinning tests of this airscrew, and the results of tests in the air will be published shortly.

The general problems of hydraulic control were dealt with next, the authors pointing out that hydraulic machinery is usually associated with operations requiring enormous force, but that nevertheless the forces available hydraulically are greater in proportion to bulk and size than any other form of steady action. A small working model was exhibited in which a variable stroke rotary pump gave pressures up to 3,000 lb./sq. in., although merely driven by hand. It was pointed out that a much smaller pressure than that, less than one-third in fact, was sufficient to operate the blades of a large airscrew fitted to the "Condor" engine. The variable pitch airscrew designed by Dr. Hele-Shaw and Mr. Beacham depends upon the action of such a pump, but operating a ram instead of the pressure gauge, the ram in turn moving the airscrew blades. The control of the pump, instead of being effected by hand, is effected by a centrifugal governor.

Before proceeding to a description of their airscrew, the authors discussed briefly the question of weight, pointing out that there is obviously a minimum weight for the economical employment of the variable pitch airscrew. If it imposed serious additional weight, then it must give advantages superior to those that could be obtained by retaining the fixed airscrew and utilising the increase in weight for increasing the engine power. The experiments made so far indicated that the weight of hydraulic gear and governor could be reduced to a comparatively small item, and that the bulk of the weight increase was due to the blades, the blade mountings and the hub. Metal blades were not in themselves heavier than wood blades, but the large centrifugal forces involved must be sustained on ball races of substantial size. The diameter of the hub must be increased to house these ball races, and its length increased to accommodate the journal bearings.

In addition to the question of weight, there was that of reliability, and the authors called attention to the fact that the gear used in their airscrew was substantially similar to that used for the steering gear of ships, of which many hundreds had been fitted with Hele-Shaw gears without any failures. The third point of importance was the provision against possible failure of parts, and the Hele-Shaw-Beacham airscrew gear was so designed that in case of a fracture of a pipe line, by a machine gun bullet, for instance, the pitch of the propeller would automatically return to the "normal" angle, and the propeller be the exact equivalent of an ordinary fixed pitch airscrew.

Without the use of illustrations, it is difficult for us to give an adequate idea of the details of the "Gloster" Hele-Shaw-Beacham variable pitch airscrew, but the following extracts and summary from the paper may serve to give at least a very general idea. "The pitch of the air-screw blades is varied by means of a double-acting hydraulic piston, operated by oil pressure from a variable stroke pump driven by the engine. The stroke of the pump is in turn controlled by a governor, also driven by the engine, so that whatever the air conditions may be, the pitch of the airscrew sets itself so as to keep the engine running at a constant, predetermined speed. The speed at which the governor operates can be altered by the pilot within certain limits by means of a small control lever; that is, the pilot has it in his power to speed up the engine and obtain extra power in an emergency, and also, on the other hand, to reduce his engine speed so that he may cruise at full throttle—this, of course, being the condition for minimum petrol consumption per brake horse-power developed by the engine. The two airscrew blades are mounted in a special hub in which they are free to rotate independently about an axis at right angles to the shaft. On each blade is fastened a crank, both cranks being operated from a common crosshead, the crankpin being connected to the crosshead in each case by a small slider, free to slide a short distance in order to compensate for the angular movement of the propeller blades. The hydraulic piston moves the crosshead forward to vary the pitch in one direction, and aft to vary it in the opposite direction."

Each propeller blade has two journal bearings and a ball race to sustain the centrifugal force on the blade without undue friction. The hydraulic piston, which is situated in its cylinder on the front of the hub, is connected to the crosshead by two bolts. The oil pressure provided by the variable stroke rotary pump is led to the two sides of the hydraulic piston via two separate pipes, one to the front and one to the rear. The variable throw crank of the pump is operated by a small governor. In the normal condition, the rod operating the change of stroke is in mid position, and no oil circulates. As soon, however, as the engine increases or decreases its speed, the governor moves the rod which determines the variable stroke, and the pump forces oil through one or other pipe, to front or back of hydraulic piston, which in turn moves forward or back, taking with it the crosshead to which the crank arms of the blades are connected.

The pilot's control takes the form of an arrangement whereby the force on the governor spring is varied, and consequently adjusts the speed at which the governor operates.

Finally, it should be pointed out that the crosshead has a centering spring, so that in the event of the hydraulic pressure failing, this spring is strong enough to return the crosshead to its central position, i.e., that corresponding with normal pitch. The hydraulic pressure available is so powerful that it can easily overcome both the force on the propeller blades and the spring pressure.

Much of the success of the "Gloster" Hele-Shaw-Beacham variable-pitch propeller depends on the design of the variable-stroke pump, but we are afraid that to make our readers understand its action, a lengthy illustrated description would be necessary, which for obvious reasons cannot be given here, although we may be in a position to give such a description at a later date.

In order to keep the pipe system full under all conditions, a small non-return valve is fitted between each pipe and a connection to the oil reservoir. In the case of the pipe under pressure, the non-return valve closes. If leakage takes place anywhere, a vacuum will tend to be created in the other pipe, and the corresponding non-return valve will automatically open, and oil will be drawn in from the reservoir to fill the void which would otherwise occur. This ensures that at all times the whole pipe system and hydraulic cylinder is absolutely full of oil, and the crosshead is thereby held rigidly, owing to the incompressibility of oil. There is consequently no backlash to start any fluttering action in the blades.

The Discussion

The Chairman recalled that as long ago as 1916 or so it was agreed that it was desirable that something should be done to encourage the development of the variable pitch airscrew, and that as a result a variable-pitch airscrew

was produced at the Royal Aircraft Factory (as it then was). That screw operated quite successfully, fitted to a BE.2C machine, and demonstrated some of the advantages to be gained by the use of the variable-pitch airscrew. He believed that both Mr. Lynam and Capt. Forsyth were concerned with it. Little was done until after the war, when a number of people tried to produce variable pitch airscrews, some of which achieved a measure of success and some none at all. He believed it was correct to say that the airscrew developed by Dr. Hele Shaw and Mr. Beacham had proved so far the most successful. It had certainly gone farther than any of the others.

Mr. Lynam (who is in charge of the Airscrew Section at the R.A.E.) said the problem of the variable-pitch airscrew was an extraordinarily fascinating one, but the obstacle in the way of its utilisation was that of its weight. If one took into account—as one must—the weight of the airscrew, the gloss was taken off the proposition. In heavier-than-air craft weight was of fundamental importance, and the weight of the variable pitch airscrews constructed so far had been so great as practically to nullify the advantages to be obtained. In lighter-than-air craft weight was less important, and there he considered that a good case could be made out for its use. But he was certainly not convinced that a very strong case could be made out for its use on heavier-than-air craft. In some of them it was possible to make out a case, but on most of them it was not.

Referring to the diagrams shown by the lecturer, he said that the fixed and variable-pitch curves coincided at the one condition for which they were designed, but in other conditions the efficiency of the fixed screw, of course, fell below that of the variable. The reason given was not strictly that to which he wished to attribute it—namely, that with coarse-pitch airscrews, with large pitch-diameter ratio and large surface, a very much greater gain was to be effected by varying the pitch than was the case with finer pitch screws. Therefore, the variable-pitch airscrew (for brevity we shall call this the v.p. airscrew—ED.) stood its best chance on geared engines, where one used airscrews of large pitch-diameter ratio and large area. Unfortunately, by getting more power from the engine by varying the pitch, one could not use that power so efficiently because in reducing the pitch so as to get higher engine speed and more power, one decreased the pitch-diameter ratio and the maximum efficiency. Secondly, one was putting more power through an airscrew of the same diameter, and therefore increasing the slipstream loss.

On supercharged engines one would expect that the v.p. airscrew had a very much greater chance of improving performance, but he believed it could be accepted that unless one were supercharging to very great heights indeed, certainly to about 20,000 ft., little advantage would be gained. Even at 20,000 ft. it was doubtful whether the v.p. airscrew represented any sensible advantage when the weight had been taken into account. There were qualifications that had to be made. For instance, if the performance at low altitude, or at medium altitude below the operational altitude, was not improved, the v.p. airscrew lost its value. Unless one could obtain more power from the engine, and unless the additional power from the engine was gained at the rate of, say, 1 h.p. for every 2 lbs. weight, one would do better by putting the weight into the engine and using a fixed pitch screw.

Mr. Lynam said he was responsible for the production of airscrew blades, and he was frequently told that the blades themselves were heavy. They were, and we had to find means of producing very much lighter blades than those produced to-day. While admitting the weight of the blades, he did not agree that they were the sole cause of the great weight of the whole v.p. airscrew. The Gloster airscrew for the "Jupiter" weighed about 180 lbs. while the weight of a fixed pitch airscrew of the same size and with similar Duralumin blades was about 100 lbs., so that there was an 80 per cent. increase in weight by the introduction of the mechanism for varying the pitch. He believed that in the case of the "Condor" engine the ratio was much the same. He advocated hollow blades except for the very small airscrews used on racing aircraft, and the use of higher grade materials. Also the blades should be hinged to the centre, since by doing that the blades became lighter because relieved of bending, and the centre became appreciably lighter for the same reason. By use of higher grade materials and hinged blades, one might get the weight of the v.p. airscrew for the "Jupiter" down to 80 or 90 lbs.

Discussing the particular automatically-controlled airscrew which Dr. Hele Shaw had evolved, he thought the automaticity introduced a great deal of mechanism, and he could not believe that anything which contained so much mechanism could be as reliable as something with less mechanism. In his opinion only one type of machine required the automatically-operated v.p. airscrew, namely, the single-seater fighting scout with supercharged engine. For large aeroplanes and seaplanes he thought it was agreed that there was no reason why one should not use the very much simpler manually-operated gear.

Col. the Master of Sempill asked Mr. Lynam if he could deal with the results of the trials which were being conducted under his supervision, to which Mr. Lynam replied that he would come to that later. He agreed as to the reliability attained by large hydraulic gear, but would ask the lecturer whether he had any experience of small hydraulic machinery. It was important that the pilot should have control over the governor. When taking off he would almost certainly want to utilise the maximum revolutions, but he would not cruise at anything like maximum revolutions. The range would have to be greater than provided at present. The pilot would want, say, 2,100 r.p.m. when taking off, and probably 1,600 r.p.m. for cruising. Blade flutter had been made out worse than it really was.

Dealing with the chairman's request for information concerning the trials, he was not sure he was permitted to give the information, as the official report had not yet been sent to the Air Ministry. He could, however, endorse Dr. Hele-Shaw's statement that the airscrew had been in flight for over 30 hours, and that no breakdown whatever had occurred. As to its operation, those at the R.A.E. were not satisfied, and had never been satisfied, but under the circumstances could not detail their grievances.

Wing-Commander T. R. Cave-Browne-Cave said he did not know what alteration of pitch angle was possible with the mechanism described. For airship work one wanted about 15° from neutral to astern, 15° from neutral to ahead, and 90° from neutral to the position of minimum drag. He doubted whether the gear described could be made to give this large angular range.

He thought the authors had not stated the whole case for the v.p. airscrew for heavier-than-air craft. It was very desirable to be able to reduce the drag of an airscrew whose engine had stopped, and he thought it was rather a special advantage of the v.p. airscrew to enable this to be done.

Flight-Lieut. Capon said it was somewhat dangerous to quote actual figures as to the improvement obtainable from a v.p. airscrew, but he had attempted to evaluate the improvement and had obtained an improvement of 4 per cent. at a pitch-diameter ratio of 0·6, 9 per cent. at 0·9, and 12 per cent. at 1·2. The improvement at the higher pitch-diameter ratio was notable, and it was difficult to imagine that any reasonable increase in weight would annul that. In the case of a single-seater fighter there would be a definite advantage because such a machine when fighting would be continually diving and rising. The variation of pitch would give it a considerably increased glide.

Wing Commander Hynes intimated that he belonged to the "anti" school. On a basis of thrust horse-power per pound weight of power plant, under the various conditions, the advantages of the v.p. airscrew were to say the least, very slight.

Col. Fell pointed out that the application of the v.p. airscrew to the super-compression engine for long-range work was very important. One worked just on the detonation point, and throttled the engine on the ground, which meant that the power when taking off was very seriously reduced. If the v.p. propeller could be used in connection with such an engine, it seemed to him that that difficulty would be overcome.

Mr. H. L. Milner, while agreeing that the question of weight was of fundamental importance, suggested that Mr. Lyman was not quite fair in criticising, on the score of weight, the first model that was produced. Naturally, in producing the first, one played for safety, as one could not afford to take the risk of a breakdown. Also, the authors of the paper had not the resources of the R.A.E. behind them. Designs had now been produced which indicated that the full equipment of the v.p. gear for the "Condor" engine could be provided with an increase of weight of 50 lbs. only. If that weight were spread over the power of the engine, it amounted to about 0·07 lb./h.p.

Mr. Burroughes said the subject of the value of the v.p. airscrew, in aiding the take off of a heavily-loaded aeroplane or seaplane, might well be elaborated. He pointed out that the value depended upon what the weight of the variable pitch gear would be. That information had not been obtained yet, but Mr. Milner had indicated that considerable savings in weight had been effected. If the weight could be still further decreased, the value of the gear would be correspondingly increased.

Mr. W. O. Manning said that some years ago, when he was experimenting with a small hydraulic mechanism, not for airscrews, he had difficulty due to air getting into the small pump and preventing it working. He would like to know the extra cost of the v.p. airscrew. Weight also was obviously of importance, and no definite conclusions could be formed unless accurate information was available.

Mr. Bramson said that at the present time a good deal of trouble, expense and weight was regarded as permissible in order to provide a supercharger, but asked what was the use of the supercharger if one had to throttle down at height because the revolutions became higher than the engine would stand. To him it seemed essential to have a v.p. airscrew to absorb the power which one had taken such trouble to obtain. He also suggested the possibility of using the v.p. airscrew for braking.

Captain Boothby related his experience, in 1912, with v.p. propellers on airships. The blades were very thin, and he was rather afraid of them. In his view, v.p. propellers would become essential in airships.

Dr. H. C. Watts said he would have liked to disagree thoroughly with Mr. Lynam, but, unfortunately, he was afraid he was in entire agreement with him on most of the points raised. Concerning the diagrams taken from his book, Dr. Watts stated that it should be pointed out that the gains shown were obtained on the assumption that all the linear dimensions had been varied. The actual gain obtained by each variation of pitch was one-half or one-third of that shown. Concerning the subject of weight, Dr. Watts said that the screw undergoing trials at Farnborough was one with hollow-steel blades made by Metal Propellers, Ltd. Whatever one's views of the v.p. propeller, the authors of the paper had helped considerably in solving one of the biggest problems of its design, *i.e.*, the difficulty of operation.

Major Mayo said it seemed to him that the v.p. propeller had been judged before it had had a proper trial. The authors had been very discreet on the subject of weight. Mr. Lynam had suggested that for every 2 lb. put on the propeller one should get 1 extra h.p. Presumably he was arguing that the weight of the power plant should be as low as 2 lb./h.p. He (Major Mayo) knew of no power plant weighing as little as 2 lb./h.p. If one took a comprehensive view, the average weight was more nearly 4 lb./h.p. It seemed to him that in judging the v.p. airscrew, the weight of petrol that was carried should be taken into account. That would make a very considerable difference in the balance sheet. In a long-range machine it might well be that the saving in petrol to be carried would make up for the whole of the increase in weight due to the v.p. gear. If that were so, the advantage of the v.p. airscrew would be obtained for nothing so to speak.

It was accepted that we must have geared engines for commercial flying, and thus conditions would be favourable for the application of the v.p. propeller. Again, it might almost be said that the limiting factor was the load with which a machine would get off. If the v.p. propeller could give an appreciable advantage in regard to take-off it would pay to carry the extra weight. From the point of view of commercial aviation, he would place the requirements of the v.p. propeller in the following order:—1, reliability; 2, light weight; and 3, reasonable cost.

The Chairman (Colonel the Master of Sempill) said he was impressed by the difference in the tone of the discussion. Usually the discussions ran riot in an optimistic direction. He agreed that the wave of pessimism was unnecessarily severe, as they could plead that the v.p. propeller was yet in its early stages, and that its weight to-day was no indication of what its weight would be when due encouragement had been given for its development. He would have thought that more stress would have been laid on the advantages of the variable pitch screw on fighting machines, and on heavily supercharged engines that would be developed in the near future. Also, he would have thought that the fact that the gear was automatic, and yet was under the control of the pilot constituted a very desirable feature.

Mr. Beacham, replying to the discussion, said that most of the criticism had been directed against the subject of weight. In designing the first gear they had no idea as to what forces were necessary to turn the blades. In consequence, they had allowed for greater forces than were necessary. As a matter of fact, the pump and the whole hydraulic system was capable of withstanding a pressure of something like 800 or 1,000 lbs. per square inch, whereas the pressure in actual flight was only about 200 lbs./sq. in. On the spinning tower the pressure went up to 600 lb., and it looked as if the engine vibration destroyed almost all the friction in the mechanism. It had now been found that the whole of the ram mechanism could be put inside the shell which surrounded the propeller. Other details had also been dealt with, and as a result, the propeller, instead of weighing 100 lbs. more than the ordinary, weighed only about 50 lb. more. On the subject of air in the hydraulic system, the condition for successful working was that the air should be expelled at a higher rate than that at which it could leak in. He was not quite sure what angular movement could be obtained. In ships' steering gear, there was a range of 45 degrees each way, and he thought that, if necessary, the range demanded by Col. Cave-Browne-Cave could be provided.

Dr. Hele-Shaw, who also replied, said that when Mr. Beacham and he had had the presumption to invent a new form of v.p. airscrew they had appreciated that they were attacking a problem which had already been the object of study by a great many minds, and very acute minds—many of them at Farnborough (laughter). Commenting upon the criticisms that had been made he said it was his experience that if everyone spoke well of a man and his invention, they did so out of sheer good nature. They felt that the poor fellow had missed the bull's eye, and that a little kindness would soften his failure. In a lecture he had delivered many years ago he had pointed out that the history of all progress was from simplicity to complexity, and not from complexity to simplicity. He quoted examples of this, such as the greater complexity of the "Jupiter" than that of a simple steam engine, and so forth. It was the same with the turbine. He welcomed the comments made on the v.p. airscrew. He and Mr. Beacham had not expected to be patted on the back for having done what Farnborough had not done, *i.e.*, produce an airscrew which did all that was required of it.

"THE BEGINNINGS OF ORGANISED AIR POWER"*

Mr. Spaight has for the occasion deserted the subject of international law for the realm of historical study. He says that in a case which occupied the attention of the High Court a few years ago, it became apparent that the history of the stages by which the existing air organisation of this country had come about had grown obscure. He has, therefore, taken upon himself the task of recording all the stages with that meticulous attention to detail and wealth of quotation and incident which characterise Mr. Spaight as a writer.

He begins by tracing the history of the Navy and setting down the stages by which it grew from being a mere branch of the army into a separate organisation. This analogy is very useful. Then he proceeds to the separation of air power from military and naval power during the war. As an important part of the converging influences which drove Great Britain, alone of the Allies, to take this step, he selects the rivalry in design of fighter aeroplanes as worthy of special notice. His account of the swaying fortunes of the air battles, according to whether Fokker or Sopwith or some other designer had got ahead of the rest, makes thrilling reading. Mr. Spaight, however, does not show with quite his customary clearness the inevitable connection between this incident and the general purpose of the book. It looks just a little as if he could not resist telling a good story; and, without doubt, the reader will be grateful to him for having told it.

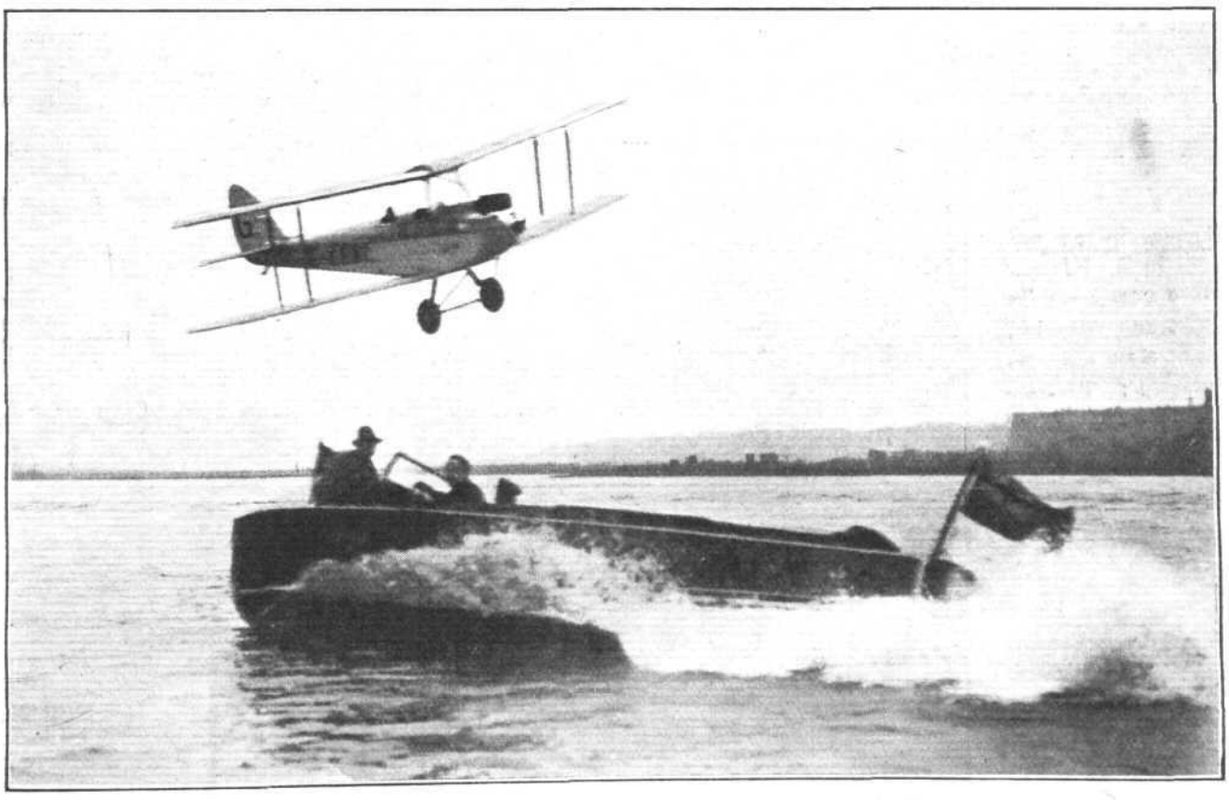
Then he gets on to the development through the stages of committee, boards, Ministry, which is the main theme of the book, and it is almost superfluous to say that each stage is traced in careful detail, and the advantages and shortcomings of each new step are very clearly and amply set forth.

The step which Great Britain took in forming a separate air force under an Air Ministry was undoubtedly momentous in the history of war in the world. Her example has been followed by Italy, and will probably soon be followed by other countries. Three of the Dominions (Australia, Canada and South Africa) have followed the example of Great Britain, though the South African Air Force is not yet quite independent of the Union's military organisation. New Zealand and the Irish Free State have not yet taken a similar step. Doubtless, from the historical point of view, it is well worth while to put on record all the circumstances which led this country to take so momentous a step, even though its actual practical utility may chiefly be to prevent the High Court from falling again into error.

The book is not entirely and purely historical. It has a propaganda side. The writer obviously wants to prove to all and sundry that the step taken was inevitable, and that the result has been so excellent that to consider any modifications must indicate a dreadfully reactionary mind—the sort of mind which would regret the passing of the so-called Heptarchy of the Anglo-Saxons before the Imperialistic arms of the West Saxon monarchs. What the book actually proves beyond dispute is that a competition for aircraft equipment between the R.F.C. of the Army and the R.N.A.S. was intolerable. It appears that the conception of air power and air defence as a separate entity was a later growth. It is a conception which, in the opinion of your reviewer, has come to stay. But it does not follow that this book proves, as it undoubtedly attemps to do, that a recognition of the prime importance of air power and of the necessity for maintaining an independent air force under an Air Ministry inevitably involves the further necessity of putting the fleet air arm and the army co-operation squadrons under the Air Ministry and making them actual parts of the air force. The arguments in this book do not rule out the view that these two arms are, or should be, parts of naval defence and military defence, not of air defence. The book certainly cites some sarcastic allusions to the awful prospect of having three air forces, but they only assault and carry a position which is not defended. Air arms are not air forces.

It appears that the birth of the Royal Air Force was an example of the British genius for improvisation in an emergency, and that out of this improvisation has grown a new conception which may well alter the future history of warfare.

* By J. M. Spaight, author of "Aircraft in War," "Air Power and War Rights," "Aircraft and Commerce in War," etc. Longmans, Green & Co., Ltd. Price 17*s*. 6*d*. net. Obtainable from "Flight" Offices.



["Flight" *Photograph*

MANŒUVRABILITY: A de Havilland "Cirrus-Moth" piloted by Capt. C. D. Barnard, "bombing" a "Chris Craft" motor boat, piloted by Mr. Arthur Bray. The scene of the duel was the Welsh Harp, and both pilots threw their craft about in a most spectacular fashion.

AIRISMS FROM THE FOUR WINDS

African Survey Cruise

Sir Alan Cobham reached Lagos on April 11 at noon in the Short "Singapore" flying-boat. He was enthusiastically received. It was eight days since the departure from Cape Town and landings had been affected at Luderitz, Walvis Bay, Port Alexander, Lobito Bay, Banana Creek, Libreville and Bonny. He considers that the weather in general on the west coast of Africa is excellent for flying, with two bad exceptions; thick fogs between Luderitz and Walvis Bay, and the constant southerly winds which would severely hinder flights southward. From Cape Town to Lobito Bay there was continuous desert for between 500 and 600 miles, no habitation and no water other than at his landing places and possibly a few others. Although there was no shelter for seaplanes an aeroplane service could operate all the way to Lobito Bay. Sir Alan remained at Lagos for four days and went on to Takoradi on April 15.

"Bert" Hinkler's Tour

Mr. and Mrs. Hinkler flew to Adelaide on April 14, a little ahead of the scheduled time. Mrs. Hinkler's mother met her daughter-in-law for the first time. Mr. Butler, the Premier, welcomed them on behalf of the State Government and there were various entertainments in the pilot's honour, including a dinner given by the Shell Company. More cheques were also presented to him amounting to hundreds of pounds. Hinkler is said to be considering an air service between England and Australia.

Lady Bailey's Crash

After her long lone flight from England towards South Africa in her D.H. "Moth" (Cirrus), Lady Bailey, as previously reported, crashed at Tabora. It is stated that Lady Bailey had no map of the Kisumu–Tabora stage, and that she flew to Nzega but found no possible landing ground. Turning back to Shinyanga, she landed there to inquire her way and then flew on to Tabora. This delay caused the arrival at the latter place during the hottest part of the day, when the air was very bumpy. The aerodrome there is 4,000 ft. above sea level. Lady Bailey thought she took insufficient notice of these conditions. Her landing was heavy and the machine turned over, breaking the fuselage and a spar. The engine and petrol tanks have been salved. It seems that an approach to the aerodrome on the west side would be easier if a gap was cut in a row of trees. Maj. Meintjes, of the South Africa Air Force, is flying a D.H. "Moth" from Pretoria to Lady Bailey to enable her to finish the flight to Cape Town.

Lieut. R. Bentley's Tour

This South Africa Air Force officer, who is flying to England from South Africa with his wife for their honeymoon, has decided to have his D.H. "Moth" (Cirrus) overhauled at Aboukir. On his flight through Africa he escorted both Lady Bailey and Lady Heath over the danger zones. He landed at Cairo on April 15.

Iraq War Ended?

It has been stated confidently by members of the Iraq Cabinet that further attacks by the Wahabi raiders are not expected. Sir Henry Dobbs, the High Commissioner, said that so profound was the effect of the R.A.F. bombing raids on the Mutair, who raided Jarishan on February 15, that the leader, Feisal ed Dowish, had abandoned further raids, at least for a time. The Euphrates population were from the first convinced that the R.A.F., together with the Iraq Army's defensive preparations, would succeed in preventing any serious attack.

Italian Air Force Movements

Four Italian machines reached Aboukir on April 15 on their way to Italian Somaliland. This is the first time that Italian machines designed for service in Somaliland have flown there. Previously they were shipped out and assembled on arrival.

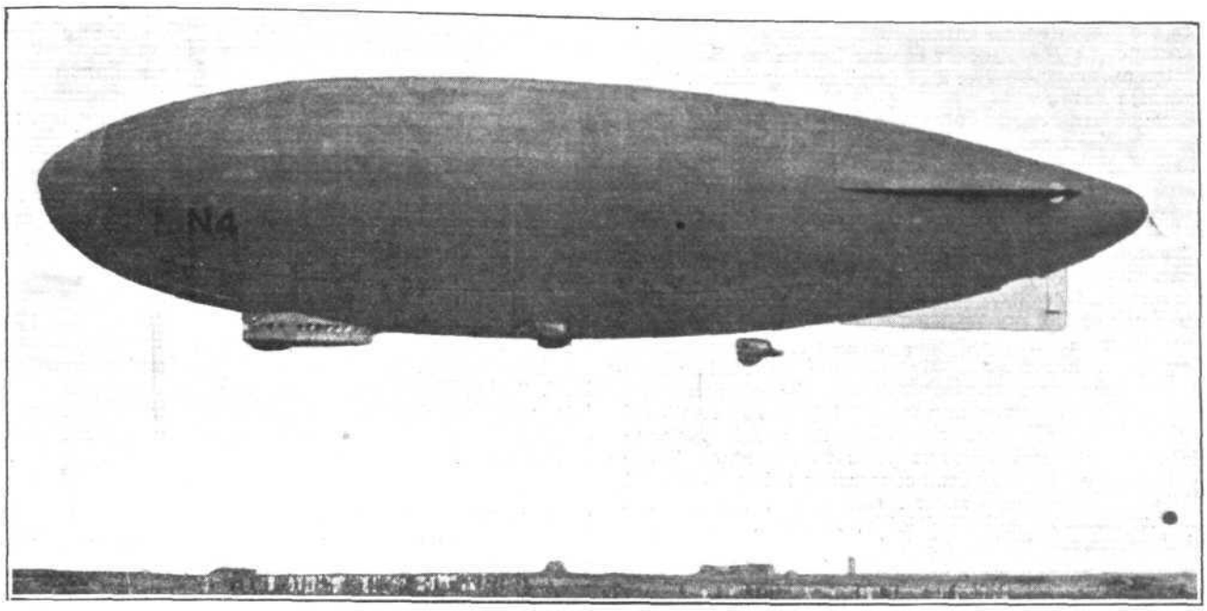
Italian Air Cruises

Two Italian air fleets of 50 machines each will shortly commence cruises round the Mediterranean, one commanded by Signor Balbo, Under-Secretary for Air, and the other, composed entirely of seaplanes, commanded by the Marquis de Pinedo.

Italian Polar Expedition Starts

General Nobile's airship, "Italia," left Baggio, the Milan airport, at 2 a.m. on April 14 for the first stage of the projected flight over the North Pole. There were twenty on board, including General Nobile. The first destination was Stolp, in Pomerania, where a landing was made on April 16. Very bad weather was encountered on this flight which

Germany's Easter Meeting at Staaken, Berlin: Three "Aces," Herr Udet, the famous war-time pilot, Miss Thea Rasche, Germany's woman pilot, and Herr Fieseler, regarded as the world's finest exponent of "aerobatics."



THE ITALIAN SEMI-RIGID AIRSHIP N.4 : This is the airship "Italia" designed by Sig. Umberto Nobile, which left Milan on April 14 for Oslo and Spitzbergen, in connection with the Polar expedition. It is 347 ft. 9 in. long, has a maximum diameter of 80 ft., and a volume of 653,420 cub. ft.

retarded progress, and whilst over Glatz, in Silesia, in the evening communication was made with a wireless station near Berlin asking if an emergency landing was advisable or if the weather would allow a return to Italy. After fighting through storms for thirty hours, in which it suffered damage to its steering gear, the landing was made. It will take many days to repair the ship.

Spanish Air Developments

THE Ministry of Labour in Spain opened tenders for the monopoly of the air lines in Spain recently. Only Spanish firms were eligible. Two tenders were entered, one by the Union Aerea Espanôla, which now operates the lines between Madrid and Lisbon and Madrid and Seville, offering to construct its three-engine and single-engine Junkers machines at Santander under patent from the Junkers Company. It also offered to establish a service between Madrid and Lisbon, Seville, Barcelona, and San Sebastian. In return, it required an annual subsidy of about £51,700 and a postal subsidy of about 4*d*. per kilogram of mail carried every 62 miles. The other tender was submitted by the Compania Aero Hispania, offering to operate as many services as the subsidy would allow.

French Bombing 'Plane Mishap

WHEN taking off near Casablanca recently a French Breguet bombing 'plane met with an unusual mishap. One of the bombs fell from the rack and exploded, detonating a second bomb. Although the machine was damaged by fragments, and the pilot and observer severely wounded, a safe landing was effected.

Germany's 40,000 Daily Miles

THE Luft Hansa Air Combine will start their summer time-table on April 23. Berlin is now linked by air with nearly every capital in Europe. In the summer, Luft-Hansa machines will cover 40,000 miles each day and connect every German town of any importance. Seaside and week-end visitors will also be catered for.

Recalling Old Times : At the Staaken (Berlin) Easter Meeting, Herr Antonius Raab flew a Bleriot Cross-Channel type of monoplane.

Spittlegate Aerodrome Changed

Spittlegate Aerodrome is now known as Grantham Air Station and becomes No. 3 Flying Training School.

An Atlantic Prize

Although the danger of attempting an Atlantic flight with unsuitable aircraft is proved beyond a doubt, it is clear that it does not deter others. Since Lindbergh started the craze there has been a succession of flights, most of which have ended disastrously. The westward course may still attract competitors, although it has been conquered by a heavier-than-air machine. As, then, it seems certain that this hazardous adventure will still be defied by others, we publish particulars of a 25,000-dollar prize which is offered by the Philadelphia *Bulletin* for the first pilot to fly from an aerodrome at any European capital non-stop in a heavier-than-air machine to Philadelphia within one year from August 4, 1927. Competitors must send in an entrance form with a fee of 25 dollars to a national aero. club affiliated with the Fédération Aéronautique Internationale at least 10 days prior to the start of the flight. The complete conditions concerning this prize should be obtained from the Aviation Committee, Philadelphia Chamber of Commerce, Philadelphia, America.

Aerial Pilgrimage to Holy Land

Three Breguet biplanes of the Spanish Royal Air Force will shortly set out on a pilgrimage to the Holy Land, where they will arrive at the same time as the pilgrimage conducted by the Bishop of Madrid and Alcalá.

Air Line for Straits Settlements

Mr. R. C. Kemp, managing director of the Air Survey Co., Ltd., states that preparations are in hand for establishing a weekly flying service between Rangoon and the Straits Settlements, and also between Singapore, Java, Sumatra and Bangkok. It is said that the aircraft used will be three-engined metal seaplanes.

Airmindedness at Norwich

One of the Norfolk and Norwich Aero Club's machines was involved in a crash on April 15, and the instructor, Mr. F. C. Fry, and his passenger, Mr. H. Brichall, a Taunton schoolmaster, were injured. The latter broke a leg and the former suffered from shock. To show his confidence and faith in aviation, a prominent Norwich manufacturer has presented the club with £100 towards meeting the sudden emergency caused by the crash.

Aeroplane v. Motor-Boat

Capt. C. D. Barnard made 10 attempts to bomb with flour a fast Chris Craft racing motor-boat at the "Welsh Harp," Hendon, on April 14, from a D.H. "Moth." He did not obtain a direct hit, but a few shots went near. The motor-boat was piloted by Mr. A. Bray, with whom was Mr. W. A. Appleton, and the rapidity and dexterity with which it was turned was too much for the light aeroplane. Capt. Barnard created great excitement occasionally when he contrived to corner the craft in the narrow bay; but, although the area was so restricted, the racer managed to escape. Capt. Barnard's flying was very skilful.

An "Avian" at South Kensington

Readers living in London, or on a visit to town, would do well to pay a visit to the Science Museum, South Kensington, where an Avro "Avian" similar to that used by Hinkler on his flight to Australia is on view next to the original Avro biplane. The progress which the two machines represent is most illuminating.

"Moths" for New Zealand

The New Zealand Government is going to purchase eight D.H. "Moths." Four of these will be loaned to the light 'plane clubs of Auckland and Christchurch, the others being employed for training purposes at the Wigran aerodrome, Christchurch.

Twenty Years Ago!

Extract from "The Auto" (Precursor of "Flight"), April 18, 1908.

"*M. Delagrange Breaks the Record.*—. . . . on Saturday afternoon, April 11, M. Delagrange attained his heart's desire by a really remarkable record-breaking flight. Having summoned the Aero Club Committee, M. Delagrange mounted his machine about 5 o'clock in the afternoon, and, without any preliminary hitch, started off on his flight round a triangular course measuring 825 metres in length. Keeping close to the ground, he successfully completed the first lap, when, on making a sharp curve at one of the corners, a wheel of his machine lightly touched the ground. It caused no mishap, nor did it in the least impede the flight, but officially it neutralised that particular round from inclusion in any record. Unfortunately, too, the same incident happened at the end of the second lap, and this caused M. Delagrange to rise to a somewhat greater altitude than he apparently desired. Four more laps he completed successfully, and had more than half accomplished the fifth when he suddenly brought his machine to rest, through the physical exhaustion resulting from the constant manipulation of the deflector plane and rudder. The judges declared the official distance of the free flight to be 3,975 metres and the official time 6 mins. 30 secs., but had the wheels of the machine not touched the ground the total distance officially recorded would have been 5,575 metres and the time 9 mins. 15 secs."

Air Literature

The Yorkshire Aeroplane Club has published a booklet entitled "Learn to Fly" in similar excellent style to that of the Newcastle Aero. Club's. Sir Sefton Brancker writes an interesting foreword, and illustrations and full particulars of the club make an informative publication for all who want to join the club.

We also draw our readers' attention to *The Countryman*, a quarterly published at 2*s.* 6*d.*, at Idbury Manor, Kingham, Oxford, by Mr. J. W. Robertson Scott, who is also the editor. Its contents are devoted entirely to the interests of the countryman, and it is produced in an original and attractive style.

Poetry

It is possible that among our readers there are some who understand poetry and other mysteries. It is possible, too, that some of them perpetrate it themselves, in which case they will be interested to hear that a prize of 100 dollars for the best poems about flying achievements is offered through the American editor of the *Poetry Review*, by Mrs. Charles D. Dickey. Poems must not exceed 56 lines, the length of four sonnets being selected as a limit. They should reach Mrs. A. H. Bartlett, Editor, American Section of the *Poetry Review*, 299, Park Avenue, New York, before October 1 next. Competitors may deal with the conquest of the air generally, or choose a particular feat, like the Atlantic flight of Lindbergh's. Incidentally, we might remind any competitors that eight years before Lindbergh's flight, Sir John Alcock and Sir Arthur Whitten Brown made the first direct Atlantic ocean crossing. And whilst we are on poetry, we draw our readers' attention to the excellent current issue of the *Poetry Review*, which contains a poem on Lindbergh and the Airman's Hymn. Also the poems about flying by Mr. Arthur Bennett, in his volume entitled *Songs in the Darkness* (published by The "Sunrise" Publishing Co., Warrington; price 5*s.* net). He is the Mayor of Warrington and father of Alfred G. Bennett, the novelist.

A New Hand-cleaner

"Emulsol" is the name given to a new preparation which has been introduced recently by the North British Publicity and Distributing Co., Ltd., of 19, Main Street, Govan, Glasgow. The preparation is in the form of a liquid, put up in nine-ounce tins and sold at one shilling per tin. A small quantity is poured on the hands and rubbed well in. When the hands have commenced to become sticky, they are moistened in water, salt or fresh, cold or hot, and a rich creamy lather results, which appears to be extremely effective in removing all dirt and grease from the hands. The preparation is guaranteed not to contain any chemicals injurious to the hands, and as a matter of fact the skin is left soft and pliable after rinsing the "Emulsol" lather off with water. The preparation can be had from the main distributors at the address given above, or from the London branch at 1a, Wardrobe Place, Carter Lane, London, E.C.4, or from most garages.

The "Eagle" Air Camera

In our description of the Avro "Avian" adapted for air survey work, which appeared in our issue for April 12, we omitted to state that the "Eagle" air camera installed was manufactured by the Williamson Manufacturing Co., Ltd., of Litchfield Gardens, London, N.W.10—a name well known for many years in connection with aerial cameras. Vickers, Ltd., are agents for this camera, and not the manufacturers, as our article may have implied.

FLIGHT

THE ROYAL AIR FORCE

London Gazette, April 13, 1928.

General Duties Branch

The following Pilot Officers are promoted to rank of Flying Officer :—E. T. M. Smalley (Oct. 12, 1927) ; B. G. Farrow (Jan.17) ; C. K. T. Hughes (March 18).

Flight-Lieut. E. C. Usher is placed on retired list on account of ill-health (April 11). The following Flying Officers resign their short service commns. :—H. Hollick-Kenyon (March 18) ; S. R. Sunnucks (April 1). G. E. Wildman-Lushington, Capt. R. M., Flight-Lieut., R.A.F., relinquishes his temp. commn. on return to duty with the Royal Marines (April 9) ; Flying Officer W. B. Causer relinquishes his short service commn. on account of ill-health (April 11).

Stores Branch

Flying Officer W. J. Eagle is transferred to Reserve Class B (April 7).

Medical Branch

Flying Officer P. H. Perkins is granted a permanent commn. in this rank (April 14).

Chaplains' Branch

The Rev. G. L. Robinson, D.S.O., is granted relative rank of Group Capt. on appointment as a Staff Chaplain (April 12)

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Flying Officer F. E. Bridges relinquishes his commn. on account of ill-health, and is permitted to retain his rank (April 11).

AUXILIARY AIR FORCE

General Duties Branch

No. 600 City of London (Bombing) Squadron.—The following Pilot Officers to be Flying Officers :—G. W. H. Wallcousins (Feb. 3) ; W. R. Massey (Feb. 28).

No. 605 County of Warwick (Bombing) Squadron.—The following to be Flying Officer :—J. P. Huins (March 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Squadron Leader A. S. Maskell to No. 3 Flying Training Sch., Grantham, 24.3.28.

Flight Lieutenant C. C. Bazell, to Home Aircraft Depot, Henlow, 28.3.28.

Flying Officers : J. R. Addams, to No. 22 Sqdn., Martlesham Heath, 1.4.28. J. W. Duggan, to No. 101 Sqdn., Bircham Newton, 2.4.28.

Pilot Officers : J. G. Elton, to No. 101 Sqdn., Bircham Newton, 2.4.28. The undermentioned Pilot Officers are posted to No. 5 Flying Training Schl., Sealand, with effect from 27.3.28 :—G. F. Simond, J. A. G. Baker, H. M. S. Barnard, M. I. Barnett, J. Beaumont, F. A. R. Bishop, B. S. Bramble, W. E. Catling, R. Chadwick, R. D. Cotton, W. J. Crisham, R. S. Darbyshire, F. P. Donovan, H. J. Forster F. C. G. Freeman, O. V. Garratt, O. I. Gilson, E. S. Greenwood, A. N. E. Hall, C. P. Haulon, J. A. Harris, B. W. C. E. Hartwell, E. G. Hitchings, T. R. Hope, H. T. Lines, V. B. Lintott, J. H. Lock, E. D. Mills, R. Mountain, V. H. Nicolay, J. S. Pole, G. E. F. Proctor, J. B. W. Pugh, C. H. Robbins, N. X. Sheldrick, L. H. Snelling, F. B. Taylor, D. Timms, J. G. Walling, R. F. Williams, and R. F. A. W Williams.

Wing Commanders : A. J. Miley, O.B.E., to R.A.F. Depot, Uxbridge, Supernumerary on ceasing to be seconded to the Chilean Navy, 1.4.28. B. L. Huskisson, D.S.C., to H.Q., Coastal Area, Supernumerary, 20.3.28. E. Osmond, C.B.E., to H.Q., R.A.F., Mediterranean, for Air Staff duties, 22.3.28.

Squadron Leaders : H.M. Probyn, D.S.O., to No. 2 Sqdn., Manston, 17.3.28. G. C. Bailey, D.S.O., to R.A.F. Depot, Uxbridge, 28.2.28.

Flight Lieutenants : H. N. Hampton, D.F.C., to No. 2 Flying Training Sch., Digby, 12.4.28. A. S. Cheshire, M.B.E., to No. 4 Flying Training Sch., Middle East, 30.3.28. W. G. E. Hayman, to H.Q., Transjordan and Palestine, 30.3.28. C. E. Barraclough, to No. 4 Flying Training Sch., Middle East, 30.3.28. F. H. Ronksley, M.C., to No. 2 Armoured Car Co., Middle East, 30.3.28. H. J. Brown, to No. 2 Armoured Car Co., Middle East, 30.3.28. A. T. K. Shipwright, D.F.C., to H.Q., Transjordan and Palestine, 30.3.28. F. M. F. West V.C., M.C., to R.A.F. Base, Malta, 30.3.28. H. G. W. Lock, D.F.C., to No. 84 Sqdn., Iraq, 30.3.28. R. J. H. Holland, to H.Q. Iraq Command, 30.3.28. J. N. Boothman, to No. 55 Sqdn., Iraq, 24.2.28. F. Woolley, D.F.C., to H.Q., Iraq Command, 30.3.28. E. S. Burns, to H.Q., R.A.F., Mediterranean 30.3.28. E. C. Barlow, to No. 30 Sqdn., Iraq, 23.3.28. H. M. Massey, M.C., to R.A.F. Cadet College, Cranwell, 5.4.28. M. M. Freehill, D.F.C., and H. G. Kirkman, to No. 2 Flying Training Sch., Digby, 5.4.28. C. R. Smythe, to No. 5 Flying Training Sch., Sealand, 5.4.28. D. M. Fleming, to No. 3 Flying Training Sch., Grantham, 5.4.28.

Flying Officers : W. G. Jones, W. G. Campbell and F. J. Moon, to No. 8 Sqdn., Middle East, 30.3.28. R. T. Read, to No. 47 Sqdn., Middle East, 30.3.28. H. L. Patch, to No. 45 Sqdn., Middle East, 30.3.28. P. R. Stroud and S. M. Thomas, to R.A.F. Depot, Uxbridge, 10.3.28. A. Maughan, to Aircraft Depot, Iraq, 30.3.28. F. S. Hodder, to No. 6 Sqdn., Iraq, 30.3.28. W. C. McNeil, to No. 481 Flight, Malta, 30.3.28. U. S. Mackay, to No. 84 Sqdn., Iraq, 30.3.28. N. H. N. Fletcher, A. L. R. Duke, and W. F. Lovering, to No. 1 Flying Training School, Netheravon, 5.4.28. V. B. Bennett, to No. 603 (City of Edinburgh) Sqdn., 5.4.28. B. C. Mason, L. G. Gray, L. H. Mason, and W. E. P. Johnson, to No. 3 Flying Training Sch., Grantham, 5.4.28. M. W. Goldie, to R.A.F. Cadet College, Cranwell, 5.4.28. G. H. Walker, to No. 5 Flying Training Sch., Sealand, 5.4.28. A. W. Whitta, to No. 2 Flying Training Sch., Digby, 5.4.28.

Pilot Officers : A. R. Sarel, to No. 480 Flight, Calshot, 27.3.28. C. K. Turner, to No. 5 Flying Training Sch., Sealand, 3.4.28. H. P. Wilson, to No. 5 Flying Training Schl., Sealand, on appointment to a Short Service Commn., 2.4.28. F. G. Fairhead, to Aircraft Depot, Iraq, 30.3.28. C. W. Grannum, to No. 481 Flight, Malta, 30.3.28. T. C. Dickens and C. S. Ellison, to No. 1 Flying Training Schl., Netheravon, 5.4.28.

Stores Branch

Squadron Leader W. J. B. Curtis, O.B.E., to R.A.F. Depot, Uxbridge, 10.3.28.

Flight Lieutenant T. A. G. Hawley, to R.A.F. Depot, Uxbridge, 17.2.28.

Flying Officers : C. J. Nobbs, to R.A.F. Depot, Middle East, 30.3.28. E. G. Jolliffe, to R.A.F. Base, Malta, 30.3.28.

Accountant Branch

Flight Lieutenants : R. Byrne, M.C., to H.Q., Aden Command, 21.3.28. F. O. Hall, to No. 45 Sqdn., Middle East, 16.3.28. H. G. Bushell, to Command Accounts Office, Iraq, 15.3.28.

Flying Officer D. J. Sherlock, to Command Accounts Office, Iraq, 19.3.28.

Chaplains' Branch

Revd. C. W. Hall, to Station H.Q., Heliopolis, 1.3.28.

Gordon Shephard Memorial Prize Essay.

The Gordon Shephard Memorial Prize for the year 1927 has been awarded by the Air Council to Wing Commander L. A. Pattinson, D.S.O., M.C., D.F.C., H.Q., Royal Air Force, India.

ROYAL AIR FORCE RIFLE ASSOCIATION

THE Miniature Rifle League was organised in the winter of 1926 for competition amongst the home units of the R.A.F. Messrs. Nobel Industries, Ltd., presented a valuable beaten-silver challenge cup with 10 silver medals and 10 bronze medals each for the second and third teams. The first stage of the competition commenced in *October, 1927 and finished in February*. Teams were entered from the Inland Area, Fighting Area, Bombing Area and from Cranwell. The winners of the first stage were :—Sealand, Eastchurch, Henlow, No. 2 (A.C.) Sqdn. ; Nos. 23 (F), 24 (C) and 32 (F) Sqdns. ; Nos. 9 and 39 (B) Sqdns., and "A" team. The chairman, Air Commodore F. C. Halahan, C.M.G., C.B.E., D.S.O., M.V.O., made the draws for the second stage. No. 23 (Fighter) Sqdn. maintained a very high standard throughout this stage, averaging 1,529·5 in their four shots, an average of nearly 95·6 per man. This constituted a record in the League. The final was witnessed at Kenley by Flight-Lieut. R. S. Bruce, M.B.E. (Northolt) and Flight-Lieut. R. E. B. Tose, on behalf of the Association and Sealand respectively, and at Sealand by Flight-Lieut. G. E. Wilson (Shrewsbury) and Pilot Officer J. Norwood, No. 23 (F) Sqdn.

The winners of the Nobel Challenge Cup and 10 silver medals were No. 23 (F) Sqdn. Kenley. No. 5 F.T. School, Sealand, were second (10 bronze medals) ; and the armament and Gunnery School, Eastchurch, third (10 bronze medals). The prizes will be awarded at 12.30 hrs. at Bisley, June 8, 1928. The scores were as follows :—

No. 23 (F) SQDN., KENLEY

Rank.	Name.	Deliberate.	Rapid.	Total.
Flying Officer ..	Gardner	97	100	197
Leading Aircraftsmn.	Lewis	97	100	197
Flight-Lieut. ..	Fairweather ..	97	98	195
Corporal	Smallwood	95	99	194
Aircraftsman ..	Crosbie	95	98	193
Flight-Lieut. ..	Calvey (Captain) ..	94	97	191
Aircraftsman ..	Corbett	97	93	190
Sergeant	Duncton	94	94	188
		766*	779*	1,545

* Highest possible score 800.

Average per member	95·75	97·375
Team average : 96·56.		
Reserves—		
Flying-Officer .. Martin	90	94 184
SM. .. .. Frier	96	83 179

No. 5 F.T. SCHOOL, SEALAND

Rank.	Name.	Deliberate.	Rapid.	Total.
Flight-Lieut. ..	Hooper (Captain) ..	98	96	194
Corporal	Rickard	96	97	193
Pilot Officer ..	Howard	93	98	191
Aircraftsman (2) ..	Baker (042) ..	96	94	190
Flying Office ..	Bryant	94	95	189
Pilot Officer ..	Markby	91	96	187
S.M.	Taylor	94	91	185
Aircraftsman (2) ..	Baker (819) ..	95	90	185
		757*	757*	1,514

* Highest possible score 800.

Average per member	94·625	94·625
Team average : 94·625		
Reserves—		
Aircraftsman .. Collings	90	89 179
Flight-Sergt. .. Pearce	96	84 180

Varsity Air News

OXFORD and Cambridge Universities have been invited to join Harvard, Yale, Pennsylvania, New York and Richmond in the first inter-collegiate air race on June 30. Col. C. Lindbergh will act as one of the judges and the race will be under the auspices of the National Aeronautical Association.

AIR POST STAMPS

By DOUGLAS ARMSTRONG

(Editor of "The Stamp Collector")

MUCH of the progress achieved by aerial navigation in the year of grace 1927 is exemplified by the number of new air post stamps that were called into being as the result of world-wide extension of the air post service. To the number of 55 distinct varieties they hailed from sixteen different countries as far apart as Persia and Newfoundland. Of these, Bulgaria, Chili, Cuba and Norway have made their initial issues of special stamps for aerial postage within the twelve months.

Pan-American Air Posts

Air post collecting is likely to undergo a new orientation as result of important developments now taking place in the aerial mail service. Particularly does this apply to South and Central America, where a whole crowd of new air post stamps and first flight covers are imminent, not only in connection with the trans-Atlantic service that has just been put in operation by the Latécoère concern between Buenos Aires and Marseilles (by way of Montevideo, Rio de Janeiro, Bahia, Fernando Noronha, Cape Verde, St. Louis, Casablanca, and Tangier), but also for use in the subsidiary services that will shortly provide a network of air post lines covering the American Continent from North to South, and branching out to the West Indies.

The first section of the Buenos Aires-Marseilles air post route has actually been in operation from the Argentine capital to Natal (the Northernmost point on the Brazilian coast) since November 22, 1927. Up to the time of writing, however, no details are available as to the air post markings in use (if any).

Brazil's First Aero Stamps

Brazil has provided a provisional set of air post stamps in denominations corresponding to the air post fees for the six stages into which the route is at present divided by overprinting with the inscription "Servicio Aereo" the unused remainder of the "Official" postage stamps of 1913, with portrait of President Hermes Fonseca, in black, as follows :—50/10 reis, grey, 200/2,000 reis, red-brown, 200/5,000 reis, bistre, 300/500 reis, yellow, 500/50 reis. grey, 1,000/20 reis, olive, and 2,000z100 reis red. It may be recalled that a few years back the Mint at Rio de Janerio was charged with the preparation of a definitive series of air post stamps bearing the likeness of M. Santos Dumont, the eminent Brazilian aviator, and it is on the cards that these may now see the light of day in succession to the present emergency issue.

The Argentine Government also has prepared a set of 18 special Air Post stamps, divided into two groups, that for the South American service comprising 5, 10, 15, 20, 25, 30, 35, 50 centavos and 1 peso, whilst for the extension to Africa and Europe the denominations are to be 18 centavos, 36 c., 54 c., 72 c., 90 c., 1·08 pesos, 1·26 p., 1·80 p., and 3·60 c., the latter franking an air post letter right through to Marseilles. Similar issues are impending in Uruguay, Paraguay, and Chile, all of whom have entered into contracts for the conveyance of mails by this route. Peru has just issued a 50 centavos stamp designated "Correo Aereo" for her newly-instituted air post system.

AIR MINISTRY NOTICE

Journey Log Books

A REVISED type of journey log book for aircraft (heavier than air) is now available, and application for these books should be addressed to the Secretary (C.A.2), Air Ministry, Gwydyr House, Whitehall, London, S.W.1, stating the registration marks of the particular aircraft for which the log book is required and enclosing the necessary fee.

The revised type of journey log book is provided with a detachable cover, which may continue to be used after the inside pages of the original issue have been completed. The price of the complete book is 4s., and of each refill 2s. 3d.

Old-type journey log books may continue to be used until completed.

No. 25 of 1928.

IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.

For 1912 and 1913, see FLIGHT for January 17, 1914.

For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1927 being given in FLIGHT, January 19, 1928.

	Imports.		Exports.		Re-Exports.	
	1927.	1928.	1927.	1928.	1927.	1928.
	£	£	£	£	£	£
Jan. ..	1,850	1,220	49,021	157,598	—	330
Feb. ..	679	1,772	63,080	118,622	—	345
Mar. ..	7,087	4,805	106,478	125,901	2,270	1,307
	9,616	7,797	218,579	402,121	2,270	1,982

PUBLICATIONS RECEIVED

U.S. National Advisory Committee for Aeronautics Reports : No. 269.—Air Force Tests of Sperry Messenger Model with Six Sets of Wings. By James M. Shoemaker. *No.* 270.—The Measurement of Pressure Through Tubes in Pressure Distribution Tests. By Paul E. Hemke. *No.* 271.—Pressure Distribution Tests on PW-9 Wing Models Showing Effects of Biplane Interference. By A. J. Fairbanks. *No.* 275.—The Effect of the Walls in Closed Type Wind Tunnels. By George J. Higgins. *No.* 276.—Combustion Time in the Engine Cylinder and Its Effect on Engine Performance. By Charles F. Marvin, Jnr. U.S. Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

Aeronautical Research Committee Reports and Memoranda : No. 1112 (*Ae.* 286).—On the Influence of Supercharging on the Performance of Aeroplanes. By R. McKinnon Wood, M.B.E. March, 1926. Price 9*d.* net. *No.* 1113 (*E.* 26).—Closed Vessel Explosions of Carbon Monoxide, Oxygen and Nitrogen Mixtures. By R. W. Fenning, M.B.E. January, 1927. Price 9*d.* net. H.M. Stationery Office, Kingsway, London, W.C.2.

NEW COMPANIES REGISTERED

UNISLIP PROPELLER CO., LTD. Milburn House, Dean St., Newcastle-on-Tyne.—Capital £5,000, in £1 shares. Objects to acquire any interests in any patents as to inventions relating to marine and aerial propellers and propelling machinery of all kinds, and in particular the Unislip Propeller, and to carry on the business of designers and manufacturers of propellers and propelling machinery of all kinds, etc. First directors, A. Kari, W. J. Wadling, J. Shaw, J. M. Pybus. Secretary, F. E. Stemson.

WM. STEPHENS AND SONS, LTD., 24, Fann Street, E.C.1.—Capital £5,000, in £1 shares (3,000 10 per cent. cumulative preference and 2,000 ordinary). Under agreement with W. S. Knott, manufacturer of motoring and flying specialities, 24, Fann Street, E.C.1, and Park Road, Bowes Park, N.11, manufacturers of goggle and eye protectors for motoring, flying, acetylene and electric welding, respirators for all industrial purposes, waterproof silk hats, etc. First directors, W. S. Knott, C. A. Knott, T. Knott. Secretary, G. E. Knott.

STERTE MANUFACTURING CO., LTD., Sterte Road, Poole, Dorset.—Capital £10,500, in £1 shares. Acquiring business of Arthur Renn, trading as Sterte Manufacturing Co., carried on at Sterte Road, Poole, manufacturers etc. of and dealers in plywood, veneer, timber, and furniture, manufacturers of aircraft propellers, aeroplanes, etc.

AERONAUTICAL PATENT SPECIFICATIONS

(*Abbreviations*: Cyl. = cylinder; i.c. = internal combustion; m. = motor. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

APPLIED FOR IN 1926

Published April 19, 1928

32,331. VICKERS, LTD., and B. W. A. DICKSON. Bombs dropped from aircraft. (287,619.)

32,728. J. L. BRUNTON and BRUNTON BROS., LTD. Brakes for aircraft. (287,645.)

APPLIED FOR IN 1927

Published April 12, 1928

770. VICKERS, LTD., and P. MAXWELL-MULLER. Girders or spars. (287,260.)

7,178. J. DE LA CIERVA. Aircraft with rotative wings. (287,319.)

12,802. ROHRBACH METALL-FLUGZEUGBAU-GES. Control mechanism for rudders, elevators, ailerons, etc. (271,460.)

18,605. G. DEI. Device for starting engines in aircraft. (274,474.)

26,062. H. JUNKERS. Lubrication of engines. (287,417.)

29,749. ROHRBACH METALL-FLUGZEUGBAU Ges. Cooling appliances for seaplane engines. (280,539.)

Published April 19, 1928

2,068. K. N. PEARSON. Mechanism for releasing bombs or other articles from aircraft. (287,671.)

18,618. A. RENARD. Mechanism for operating valves of radial-cylinder i.c. engines. (287,761.)

24,552. L. M. CAMPAU. Dirigible balloons. (287,793.)

35,360. FOCKE-WULF FLUGZEUGBAU AKT.-GES. Aeroplanes. (282,830.)

APPLIED FOR IN 1928

Published April 12, 1928

3,953. L. BECHEREAU. Braking-means between bodies adapted to be displaced within one another, especially rectilinear shock-absorbers. (285,059.)

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